

Curriculum Vitae
Roger Harquail French

Department of Materials Science and Engineering
Case Western Reserve University

May 18, 2025

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Curriculum Vitae

Roger Harquail French

Materials Science and Engineering

Links: [MDS³ COE](#); [SDLE Res. Cntr](#); [CWRU Website](#); [Google Scholar](#);

Google Scholar h-index: 56; i10-index: 213 Citations: 14,469; [ORCID: 0000-0002-6162-0532](#);

[dblp bibliography](#)

PERSONAL DATA

Born December 29, 1957; married, two children, fluent in Spanish, U. S. Citizen.

EDUCATION

Ph. D., Materials Science and Engineering, **Massachusetts Institute of Technology** May 1985

Electronic Structure of Al₂O₃: VUV Reflectivity Measurements from Room Temperature to 1100°C.

Thesis Adviser: R. L. Coble

B. S. with distinction, Materials Science and Engineering, **Cornell University** May 1979

PROFESSIONAL POSITIONS

Tohoku University, Sendai Japan:

Visiting Professor, Inst. of Multidisciplinary Res. for Adv. Materials (IMRAM), February 2023 - March 2023

Visiting Professor, Inst. of Multidisciplinary Res. for Adv. Materials (IMRAM), February 2022 - March 2022

Visiting Professor, Inst. of Multidisciplinary Res. for Adv. Materials (IMRAM), February 2021 - May 2021

Visiting Professor, Graduate School of Information Science, May 2019 - July 2019

International Energy Agency, Photovoltaic Power Systems Programme (IEA-PVPS):

Task 13: Performance and Reliability of Photovoltaic Systems 2014 - 2025

U. S. Dept. of Energy, Office of Science:

Basic Energy Sciences Advisory Committee (BESAC) 2011 to 2016

Case Western Reserve University:

Distinguished University Professor, May 2025 to present. Kyocera Professor of Ceramics, July 2016 to present,
Materials Science & Engineering, Case School of Engineering.

Director, [Materials Data Science for Stockpile Stewardship, Center of Excellence \(MDS³ COE\)](#),

U. S. Dept. of Energy, National Nuclear Security Administration (DOE-NNSA) September 2022 to present.

Thrust 1 Lead and co-PI, [Center for Advancing Sustainable and Distributed Fertilizer Production \(CASFER\)](#),

National Science Foundation, Engineering Research Center, September 2022 to present.

F. Alex Nason Professor, September 2010 to June 2016,

Faculty Director, Applied Data Science (ADS) Program,

[ADS Undergraduate Minor](#) and [ADS Graduate Certificate](#) November 2014 to present.

Secondary Appts. in Computer & Data Sciences, Macromolecular Science & Eng., Biomedical Eng., Physics.

Director: SDLE Research Center, an Ohio Third Frontier, Wright Project Center July 2011 to present.

University of Pennsylvania:

Adjunct Professor, Materials Science Department. 1996 to August 2010.

DuPont Co. Central Research:

Research Fellow, May 2006 to August 2010.

Senior Research Associate, Dec. 2000 to April 2006.

Research Associate, Dec. 1996 to Dec. 2000.

Senior Research Scientist, Oct. 1993 to Dec. 1996.

Research Scientist, Mar. 1990 to Oct. 1993.

Research Chemist, Nov. 1985 to Mar. 1990.

Massachusetts Institute of Technology:

Visiting Research Scientist, Feb. 1986 to Feb. 1988.

Post-Doctoral Associate, Oct. 1984 to Oct. 1985.

Graduate Research Assistant, Feb. 1980 to Oct. 1984.

Cornell University:

Research Assistant,

May 1976 to May 1979.

RESEARCH EXPERIENCE

Optical Properties & Electronic Structure of Ceramics, Polymers, Optical & Biomolec. Materials.

- VUV/UV/Vis spectroscopy: SrTiO₃, Si₃N₄, SiO₂, SiC, Al₂O₃, AlN, AlPO₄, ZrO₂, LiB₃O₅, BaB₂O₄.
- Fluoropolymers, Poly(di-alkylsilanes), Polystyrene, Ethylene co-polymers, Polyester, Urethanes.
- Duplex and Quadruplex DNA, Collagen and Bovine Serum Albumen Proteins, Cowpea Mosaic virus.
- Spatially resolved valence electron energy loss spectroscopy of interfaces: Al₂O₃, SrTiO₃, Si₃N₄.

Long Range Interactions in Nanoscale Assembly: van der Waals (vdW) Interactions

- Hamaker Coefficients from VUV (bulk), VEELS (interfaces) and *ab initio* optical properties.
- vdW forces and torques of carbon nanotube chiralities, DNA, Collagen, and BSA.

Optical Materials & Elements & Optics of Complex Microstructures

- Backsheets, encapsulants and optical enhancements for Crystalline Silicon Photovoltaics.
- Computational optics using finite element solutions to Maxwell's Equations.
- Near and far field optical interactions and multiple scattering in complex microstructures.

Radiation Durability and Photochemical Degradation of Optical Materials

- Controlling and disabling intrinsic and extrinsic photochemical degradation mechanisms.
- Laser radiation durability at 248 nm, 193 nm, and 157 nm wavelengths.
- Full spectrum solar radiation durability at 1 to 1000 Suns irradiance.

Data Science of Long Lived, Outdoor-Exposed Technologies: Degradation Science

- Engineering Epidemiology: Statistical and Machine Learning: for lifetime performance prediction.
- Data-driven New Technology Insertion: without lifetime penalties
- Real-world & Lab-based cross-correlation of degradation pathways.
- Virtual energy audits of commercial buildings, to improve energy efficiency.

Data-centric Deep Learning and Artificial Intelligence

- Geospatiotemporal predictive models of agricultural fertilizers moving through US watersheds
- Graph neural network modeling of population-based spatiotemporal studies of real-world systems.
- Data science and analytics, machine and deep learning and artificial intelligence approaches, based on Hadoop3/Hbase/Spark for petabyte-petaflop computing, for network modeling of energy systems.

PROFESSIONAL MEMBERSHIPS

American Assoc. for the Adv. of Science (AAAS), since 2012, American Ceramic Society, since 1980, American Chemical Society, since 2000, American Physical Society, since 1982, American Solar Energy Society, since 2012, American Society for Testing and Materials (ASTM), since 2012, American Statistical Assoc., since 2014, Assoc. of Computing Machinery, since 2019, Institute of Electrical & Electronics Engineers (IEEE), since 2007, IEEE Electron Devices Society, since 2007, IEEE Reliability Society, since 2014, Materials Research Society, since 1982, Optical Society of America, since 2010, International Society for Optical Engineering (SPIE), since 1995.

AWARDS & HONORS

- 2025 Selected as [Distinguished University Professor](#), Case Western Reserve University.
- 2023 Awarded by the U. S. Dept. of Energy, National Nuclear Security Administration, [Los Alamos National Laboratory, Director's Colloquium Series Seminar](#), October 2023.
- 2023 Recipient of CWRU's 2023 Innovation Week Inventor Award for [US Patent 11,403,647](#).
- 2020 Recipient of Case Western Reserve University's [Faculty Distinguished Research Award](#).
- 2020 Elevated to IEEE Senior Member.
- 2017 Recipient of the CWRU's, Case School of Engineering Research Award, 2017.
- 2011 Appointed To U. S. Department of Energy, [Basic Energy Sciences Advisory Committee \(BESAC\)](#).
- 2002 [Samuel Geijsbeek Award](#) of the American Ceramic Society, Pacific Coast Region.
- 2002 Nominated to National Academy of Engineering's [Frontiers of Engineering Symposium](#).
- 1999 [Fellow of the American Ceramic Society](#).
- 1998 [Fulrath Award](#) of the American Ceramic Society and Ceramic Society of Japan.
- 1989 [R & D 100 Award](#) for LPS-521 VUV-LPLS Spectrophotometer

PUBLICATIONS & THESES SUMMARY

He has published 189 journal articles, 185 proceedings papers, 1 book, 22 book chapters, 5 workshop reports, 19 software packages, 14 open datasets, 177 invited talks, 396 conference presentations, and 28 issued U. S. patents. He has graduated 18 Ph.D and 32 MS students, and has 9 Ph.D and 9 MS students.

PUBLICATIONS

6.1 Refereed Articles

2025

190. J.E. Gordon, O.D. Akanbi, D.C. Bhuvanagiri, H.E. Omodolor, V. Mandayam, R.H. French, J.M. Yarus, E.I. Barcelos, Geospatial modeling of near subsurface temperatures of the contiguous United States for assessment of materials degradation, *Sci Rep* 15 (2025) 1053. <https://doi.org/10.1038/s41598-024-85050-3>.
189. Dylan J. Colvin, Max Liggett, Balaaswhin Babu, Udit Kumar, Craig J. Neal, Sudipta Seal, Nafis Iqbal, Jannatul Ferdous Mousumi, Mengjie Li, Hubert P. Seigneur, Dana B. Kern, Steve W. Johnston, Dirk C. Jordan, Tae Kyong John Kim, Laura S. Bruckman, Ina T. Martin, Andrew M. Gabor, Roger H. French, Kristopher O. Davis, Root Cause Analysis of Silicon Heterojunction Module Degradation from 10-Year-Old Florida Rooftop System, *Progress in Photovoltaics* (2025).

2024

188. Y. Fan, R. Wieser, L.S. Bruckman, R.H. French, Y. Wu, Parallel-friendly Spatio-Temporal Graph Learning for Photovoltaic Degradation Analysis at Scale, in: *Proceedings of the 33rd ACM International Conference on Information and Knowledge Management*, ACM, Boise ID USA, 2024: pp. 4470–4478. <https://doi.org/10.1145/3627673.3680026>.
187. T.G. Ciardi, A. Nihar, R. Chawla, O. Akanbi, P.K. Tripathi, Y. Wu, V. Chaudhary, R.H. French, Materials data science using CRADLE: A distributed, data-centric approach, *MRS Communications* 14 (2024) 601–611. <https://doi.org/10.1557/s43579-024-00616-6>.
186. K.J. Hernandez, T.G. Ciardi, R. Yamamoto, M. Lu, A. Nihar, J.C. Jimenez, P.K. Tripathi, B. Giera, J.-B. Forien, J.J. Lewandowski, R.H. French, L.S. Bruckman, L-PBF High-Throughput Data Pipeline Approach for Multi-modal Integration, *Integr Mater Manuf Innov* (2024). <https://doi.org/10.1007/s40192-024-00368-0>.
185. Weiqi Yue, Mohommad Redad Mehdi, Pawan K. Tripathi, Matthew A. Willard, Frank Ernst, Roger H. French, Exploring 2D X-ray diffraction phase fraction analysis with convolutional neural networks: Insights from kinematic-diffraction simulations, *MRS Advances* 9 (2024) 921–928. <https://doi.org/10.1557/s43580-024-00862-9>.
184. H.H. Aung, J.C. Jimenez, B. Au, P. Caviness, R. Cerda, Q.D. Tran, P. Tripathi, B. Giera, R.H. French, L.S. Bruckman, Towards a study protocol: A data-driven workflow to identify error sources in direct ink write mechatronics, *MRS Advances* 9 (2024) 837–843. <https://doi.org/10.1557/s43580-024-00846-9>.
183. A. Ngo, K. Hernandez, A.E. Olatunde, T.G. Ciardi, A. Harding, A. Nifar, A. Mondal, R.H. French, L.S. Bruckman, J.J. Lewandowski, Image-Based Fracture Surface Defect Characterization Methods for Additively Manufactured Ti-6Al-4V Tested in Fatigue, *JOM* (2024). <https://doi.org/10.1007/s11837-024-06655-7>.
182. Kristen J. Hernandez, Erika I. Barcelos, Jayvic C. Jimenez, Arafath Nihar, Pawan K. Tripathi, Brian Giera, Roger H. French, Laura S. Bruckman, A Data Integration Framework of Additive Manufacturing Based on Fair Principles, *MRS Advances* (2024). <https://doi.org/10.1557/s43580-024-00874-5>.
181. S. Nalin Venkat, T.G. Ciardi, M. Lu, P.C. DeLeo, J. Augustino, A. Goodman, J.C. Jimenez, A. Mondal, F. Ernst, C.A. Orme, Y. Wu, R.H. French, L.S. Bruckman, A General Materials Data Science Framework for Quantitative 2D Analysis of Particle Growth from Image Sequences, *Integr Mater Manuf Innov* 13 (2024) 71–82. <https://doi.org/10.1007/s40192-024-00342-w>.
180. Y. Fan, R. Wieser, X. Yu, Y. Wu, L.S. Bruckman, R.H. French, Using Spatio-Temporal Graph Neural Networks to Estimate Fleet-Wide Photovoltaic Performance Degradation Patterns, *PLOS ONE* 19 (2024) e0297445. <https://doi.org/10.1371/journal.pone.0297445>.

179. Benjamin G. Pierce, Hein Htet Aung, Thomas G. Ciardi, Kristen J. Hernandez, Raymond J. Wieser, Weiqi Yue, Yangxin Fan, Alexander C. Harding Bradley, Balashanmuga Priyan Rajamohan, Erika I. Barcelos, Jayvic C. Jimenez, Brian K. Spears, Brian Giera, Robert X. Gao, Mengjie Li, Kristopher O. Davis, Laura S. Bruckman, Yinghui Wu, Pawan K. Tripathi, Roger H. French, Data-driven Digital Twins: Generalized Foundation Models for Fleet-Level System Performance Prediction, *Advanced Manufacturing Tool and Part Qualification, Conformance, and Lifetime*, *Sci Rep* (2024) submitted.
178. O.D. Akanbi, D.C. Bhuvanagiri, E.I. Barcelos, A. Nihar, B. Gonzalez Hernandez, J.M. Yarus, R.H. French, Integrating Multiscale Geospatial Analysis for Monitoring Crop Growth, Nutrient Distribution, and Hydrological Dynamics in Large-Scale Agricultural Systems, **Journal of Geovisualization and Spatial Analysis**, 8 (2024) 9. <https://doi.org/10.1007/s41651-023-00164-y>.
177. W. Yue, P.K. Tripathi, G. Ponon, Z. Ualikhankyzy, D.W. Brown, B. Clausen, M. Strantz, D.C. Pagan, M.A. Willard, F. Ernst, E. Ayday, V. Chaudhary, R.H. French, Phase Identification in Synchrotron X-ray Diffraction Patterns of Ti-6Al-4V Using Computer Vision and Deep Learning, **Integr Mater Manuf Innov** (2024). <https://doi.org/10.1007/s40192-023-00328-0>.

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176. Arafath Nihar, Thomas Ciardi, Rounak Chawla, Olatunde D. Akanbi, Vipin Chaudhary, Yinghui Wu, Roger H. French, Accelerating Time to Science using CRADLE: A Framework for Materials Data Science, in: **30th IEEE International Conference On High Performance Computing, Data, & Analytics**, Goa, India, 2023. <https://doi.org/10.1109/HiPC58850.2023.00041>
175. L.M. Pirnstill, Y. Qiu, R.H. French, C. Kharangate, Statistical and machine learning applied to the universal consolidated database to predict heat transfer coefficient in flow condensation, **Numerical Heat Transfer, Part B: Fundamentals** 0 (2023) 1–28. <https://doi.org/10.1080/10407790.2023.2269307>.
174. Yangxin Fan, Xuanji Yu, Raymond Wieser, David Meakin, Avishai Shaton, Robert Flottesmesch, Michael Howell, Jennifer Braid, Laura S.Bruckman, Roger H.French, Yinghui Wu, “Spatio-Temporal Denoising Graph Autoencoders with Data Augmentation for Photovoltaic Data Imputation”, **ACM SIGMOD/PODS International Conference on Management of Data, Data-intensive Applications (DIA) Track**, June 18-23, 2023, Seattle Washington. <https://doi.org/10.1145/3588730>.
173. D.C. Meshnick, N. Shahini, D. Ganguly, Y. Wu, R.H. French, V. Chaudhary, Enhancing Scientific Image Classification through Multimodal Learning: Insights from Chest X-Ray and Atomic Force Microscopy Datasets, in: **2023 IEEE International Conference on Big Data (BigData)**, 2023: pp. 2211–2220. <https://doi.org/10.1109/BigData59044.2023.10386478>.
172. M. Lu, S.N. Venkat, J. Augustino, D. Meshnick, J.C. Jimenez, P.K. Tripathi, A. Nihar, C.A. Orme, R.H. French, L.S. Bruckman, Y. Wu, Image Processing Pipeline for Fluoroelastomer Crystallite Detection in Atomic Force Microscopy Images, **Integr Mater Manuf Innov** (2023). <https://doi.org/10.1007/s40192-023-00320-8>.
171. M. Adachi, S. Hamaya, D. Morikawa, B.G. Pierce, A.M. Karimi, Y. Yamagata, K. Tsuda, R.H. French, H. Fukuyama, Temperature dependence of crystal growth behavior of AlN on Ni–Al using electromagnetic levitation and computer vision technique, **Materials Science in Semiconductor Processing**. 153 (2023) 107167. <https://doi.org/10.1016/j.mssp.2022.107167>.
170. A. J. Curran, X. Yu, J. Liu, D. J. Colvin, N. Iqbal, T. Moran, B. Brownell, M. Li, K. O. Davis, B. D. Huey, J.-N. Jaubert, J. L. Braid, L. S. Bruckman, R. H. French, Field studies of PERC and Al-BSF PV module performance loss using power and I-V timeseries, **Frontiers in Energy Research**. 11 (2023). <https://www.frontiersin.org/articles/10.3389/fenrg.2023.1127775> (accessed July 17, 2023).
169. Sameera Nalin Venkat, Xuanji Yu, Jiqi Liu, Jakob Wegmueller, Jayvic Cristian Jimenez, Erika I. Barcelos, Hein Htet Aung, Xinjun Li, Jean-Nicolas Jaubert, Roger H. French, Laura S. Bruckman, Statistical Analysis and Degradation Pathway Modeling of Photovoltaic Minimodules with Varied Packaging Strategies, **Frontiers in Energy Research**. 11 (2023). <https://doi.org/10.3389/fenrg.2023.1127796>.

168. H.H. Aung, D. Li, J. Liu, C. Barretta, Y. Sheng, Y.J. Jo, J.C. Jimenez, E.I. Barcelos, G. Oreski, R.H. French, L.S. Bruckman, Lifetime and Degradation Study of Poly(Methyl Methacrylate) via a Data-Driven Study Protocol Approach, **Integr Mater Manuf Innov** (2023). <https://doi.org/10.1007/s40192-023-00322-6>.

2022

167. N. Iqbal, D.J. Colvin, E.J. Schneller, T.S. Sakhivel, R. Ristau, B.D. Huey, B.X.J. Yu, J.-N. Jaubert, A.J. Curran, M. Wang, S. Seal, R.H. French, K.O. Davis, Characterization of front contact degradation in monocrystalline and multicrystalline silicon photovoltaic modules following damp heat exposure, **Solar Energy Materials and Solar Cells**. 235 (2022) 111468. <https://doi.org/10.1016/j.solmat.2021.111468>.
166. Liangyi Huang, Sophia Hall, Fei Shao, Arafath Nihar, Vipin Chaudhary, Yinghui Wu, Roger French, and Xusheng Xiao, "System-Auditing, Data Analysis and Characteristics of Cyber Attacks for Big Data Systems," **Proceedings of 31st ACM International Conference on Information and Knowledge Management (CIKM2022)**, Atlanta GA, USA, 2022.

2021

165. N. Iqbal, D.J. Colvin, A.J. Curran, F. Li, J.P. Ganesan, D.B. Sulas-Kern, S.P. Harvey, A. Norman, J. Karas, G. Tamizhmani, J.-N. Jaubert, P. Banerjee, B.D. Huey, R.H. French, K.O. Davis, Multiscale Characterization of Photovoltaic Modules—Case Studies of Contact and Interconnect Degradation, **IEEE Journal of Photovoltaics**. 12 (2022) 62–72. <https://doi.org/10.1109/JPHOTOV.2021.3124751>.
164. A. Bard, Y. Qiu, C. R. Kharangate, R. H. French, "Consolidated modeling and prediction of heat transfer coefficients for saturated flow boiling in mini/micro-channels using machine learning methods," **Applied Thermal Engineering**, vol. 210, p. 118305, Jun. 2022, doi: 10.1016/j.applthermaleng.2022.118305. <https://www.sciencedirect.com/science/article/pii/S1359431122002642>.
163. G. Oreski, J. Stein, G. Eder, K. Berger, L. Bruckman, R. H. French, J. Vedde, K.-A. Weiss, Motivation, benefits, and challenges for new photovoltaic material and module developments, **Prog. Energy**. (2022). <https://doi.org/10.1088/2516-1083/ac6f3f>.

2021

162. N. Bosco, M. Springer, J. Liu, S.N. Venkat, R.H. French, Employing Weibull Analysis and Weakest Link Theory to Resolve Crystalline Silicon PV Cell Strength Between Bare Cells and Reduced- and Full-Sized Modules, **IEEE Journal of Photovoltaics**, (2021) 1–11. <https://doi.org/10.1109/JPHOTOV.2021.3056673>.
161. A.M. Karimi, Y. Wu, M. Koyuturk, R.H. French, Spatiotemporal Graph Neural Network for Performance Prediction of Photovoltaic Power Systems, in: **Proceedings of the AAAI Conference on Artificial Intelligence**, Association for the Advancement of Artificial Intelligence, Virtual, 2021: p. 8. <https://ojs.aaai.org/index.php/AAAI/article/view/17799>.
160. M.A. Hossain, A. Khalilnejad, R. Haddadian, E.M. Pickering, R.H. French, A.R. Abramson, Data Analytics Applied to the Electricity Consumption of Office Buildings to Reveal Building Operational Characteristics, **Advances in Building Energy Research**. 15 (2021) 755–773. <https://doi.org/10.1080/17512549.2020.1730239>.
159. M.D. Kempe, J. Morse, J. Eafanti, S.E. Julien, K. Wan, L.S. Bruckman, Y. Wang, R.H. French, A. Fairbrother, X. Gu, S. Napoli, G.S. O'Brien, A.W. Hauser, L. Ji, K.P. Boyce, Measurement of Crack Length in Width Tapered Beam Experiments, **Journal of Adhesion Science and Technology**. 35 (2021) 357–374. <https://doi.org/10.1080/01694243.2020.1801271>.
158. A. Khalilnejad, R.H. French, A.R. Abramson, Evaluation of cooling setpoint setback savings in commercial buildings using electricity and exterior temperature time series data, **Energy**. 233 (2021) 121117. <https://doi.org/10.1016/j.energy.2021.121117>.

157. S. Lindig, D. Moser, A.J. Curran, K. Rath, A. Khalilnejad, R.H. French, M. Herz, B. Müller, G. Makrides, G. Georghiou, A. Livera, M. Richter, J. Ascencio-Vásquez, M. van Iseghem, M. Meftah, D. Jordan, C. Deline, W. van Sark, J.S. Stein, M. Theristis, B. Meyers, F. Baumgartner, W. Luo, International collaboration framework for the calculation of performance loss rates: Data quality, benchmarks, and trends (towards a uniform methodology), **Progress in Photovoltaics: Research and Applications**. 29 (2021) 573–602. <https://doi.org/10.1002/pip.3397>.
156. J. Liu, M. Wang, A.J. Curran, E. Schnabel, M. Köhl, J.L. Braid, R.H. French, Degradation mechanisms and partial shading of glass-backsheet and double-glass photovoltaic modules in three climate zones determined by remote monitoring of time-series current–voltage and power datastreams, **Solar Energy**. 224 (2021) 1291–1301. <https://doi.org/10.1016/j.solener.2021.06.022>.

2020

155. R.H. French, L.S. Bruckman, Learnings from developing an applied data science curricula for undergraduate and graduate students, in: **MRS Advances**, 2020: pp. 1–7. <https://doi.org/10.1557/adv.2020.135>.
154. S.E. Julien, M.D. Kempe, J.J. Eafanti, J. Morse, Y. Wang, A. Fairbrother, S. Napoli, A.W. Hauser, L. Ji, G.S. O’Brien, X. Gu, R.H. French, L.S. Bruckman, K. Wan, K.P. Boyce, Characterizing photovoltaic backsheet adhesion degradation using the wedge and single cantilever beam tests, Part I: Field Modules, **Solar Energy Materials and Solar Cells**. 215 (2020) 110669. <https://doi.org/10.1016/j.solmat.2020.110669>.
153. S.E. Julien, M.D. Kempe, J.J. Eafanti, J. Morse, Y. Wang, A.W. Fairbrother, S. Napoli, A.W. Hauser, L. Ji, G.S. O’Brien, X. Gu, R.H. French, L.S. Bruckman, K. Wan, K.P. Boyce, Characterizing photovoltaic backsheet adhesion degradation using the wedge and single cantilever beam tests, Part II: Accelerated tests, **Solar Energy Materials and Solar Cells**, 211 (2020) 110524. <https://doi.org/10.1016/j.solmat.2020.110524>.
152. A.M. Karimi, J.S. Fada, N.A. Parrilla, B.G. Pierce, M. Koyutürk, R.H. French, J.L. Braid, Generalized and Mechanistic PV Module Performance Prediction From Computer Vision and Machine Learning on Electroluminescence Images, **IEEE Journal of Photovoltaics**, (2020) 1–10. <https://doi.org/10.1109/JPHOTOV.2020.2973448>.
151. A. Khalilnejad, R.H. French, A.R. Abramson, Data-driven evaluation of HVAC operation and savings in commercial buildings, **Applied Energy**, 278 (2020) 115505. <https://doi.org/10.1016/j.apenergy.2020.115505>.
150. A. Khalilnejad, A.M. Karimi, S. Kamath, R. Haddadian, R.H. French, A.R. Abramson, Automated Pipeline Framework for Processing of Large-Scale Building Energy Time Series Data, **PLOS ONE**, 15 (2020) e0240461. <https://doi.org/10.1371/journal.pone.0240461>.
149. A. Longacre, M. Martin, T. Moran, O.V. Kolosov, E. Schneller, A.J. Curran, M. Wang, J. Dai, L.S. Bruckman, J.-N. Jaubert, K.O. Davis, J.L. Braid, R.H. French, B.D. Huey, Direct nanoscale mapping of open circuit voltages at local back surface fields for PERC solar cells, **J Mater Sci.**, (2020). <https://doi.org/10.1007/s10853-020-04736-x>.
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7.2 Patent Filings

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PRESENTATIONS

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177. Roger H. French, Invited: Data-centric AI for Materials: Enabled by Distributed Computing, Ontologies and Graph Deep Learning, GE Aerospace, AI Team Seminar, December 5, 2024.
176. Roger H. French, Invited: Data-centric AI for Materials: Enabled by Distributed Computing, Ontologies and Graph Learning, Schenectady NY, October 2nd, 2024.
175. Roger H. French, Alexander C. H. Bradley, Balashanmuga Priyan Rajamohan, Arafath Nihar, Thomas G. Ciardi, Weiqi Yu, Redad Medhi, Erika I. Barcelos, Pawan K. Tripathi, Frank Ernst, Matthew A. Willard, Invited: Data-centric AI for Synchrotron Science: Enabled by FAIR, Pipelines, Graph Learning, (2024). <https://www.aps.anl.gov/Users-Information/User-Community/Users-Meetings>.
174. Roger H. French, Yangxin Fan, Raymond Wieser, Arafath Nihar, Thomas Ciardi, Alexander Bradley, Priyan Rajamohan, Benjamin Pierce, Pawan Tripathi, Erika Barcelo, Laura Bruckman, Yinghui Wu, Invited Plenary: Data-centric AI Foundation Models for Fleet-wide Data Imputation, Performance and Degradation Analysis of PV Systems, (2024). <https://ieee-pvsc.org/PVSC52/>.

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169. Roger H. French, Mingjian Lu, Liangyi Huang, Will C. Oltjen, Xuanji Yu, Arafath Nihar, Thomas G. Ciardi, Erika Barcelos, Pawan Tripathi, Abhishek Daundkar, Deepa Bhuvanagiri, Hope Omodolor, Olatunde Akanbi, Hein Htet Aung, Kristen J. Hernandez, Mirra M. Rasmussen, Raymond J. Wieser, Sameera N. Venkat, Tian Wang, Weiqi Yue, Yangxin Fan, Rounak Chawla, Leean Jo, Zelin Li, Jiqi Liu, Justin P. Glynn, Kehley A. Coleman, Jeffrey M. Yarus, Mengjie Li, Kristopher O. Davis, Laura S. Bruckman, Yinghui Wu, Invited: FAIRification Using Materials Domain Ontologies: Enabling Open Data And Models for Improved Knowledge Management and Learning, **CASFER Colloquiu**, virtual, March 3rd, 2023.
168. Roger H. French, Invited: Accelerating Time to Science sans Human Interaction: Materials Data Science, Enabled by Integration of Distributed and High-Performance Computing, [Advanced Photon Source Computational Seminar Series](#), Argonne National Laboratory, Chicago, Illinois, USA, October 16th, 2023.
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167. P. Tripathi, W. Yue, G. Ponon, N. Tomczak, Z. Ualikhankyzy, V. Chaudhary, R. French, M. Willard, Invited: 2D-High Energy X-ray Diffraction (2D-HEXRD) Big Data Science, (2022).
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164. Roger H. French, Transformative Applications of Materials Data Science: Spatiotemporal Studies and Convolutional and Graph Neural Network Learning To Solving Materials Challenges, **UCF Materials Science Department Seminar**, University of Central Florida, Orlando Florida, April 8th, 2022.

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162. Roger H. French, Ahmad M. Karimi, Invited: Spatiotemporal Graph Neural Network for Performance Prediction of Photovoltaic Power Systems, **RIEC International Symposium, When AI Meets Human Science: the 4th Tohoku-NTU Symposium on Interdisciplinary AI and Human Studies**, Taiwan (March 12th, 2021).
161. Roger H. French, Invited: Degradation Science and Lifetime Extension for Complex Materials Systems: Applying Spatiotemporal-graph Learning at Scale with Time-series, Spectral and Image Datasets, **DOE NNSA Multi-lab Workshop on Challenges in Stockpile Surveillance and Modernization**, Virtual, April 6th, 2021. <https://engineering.case.edu/centers/sdle/sites/engineering.case.edu/centers.sdle/files/2102frenchcwru-ler-ai-ml-4-energyscience-nnsa.pdf>
160. Roger H. French, Invited: Degradation Science and Lifetime Extension for Complex Materials Systems: Remote Diagnostics Using Timeseries P, I-V Datastreams, and Network Modeling of Degradation Pathways, **PNNL Materials Aging and Detection Science Seminar Series**, DOE Pacific Northwest National Laboratory, August 5th, 2021.
159. Roger H. French, Benjamin G Pierce, Invited: Machine Learning and Image Processing Techniques for Materials Evaluation, **Materials Informatics for Images and Multi-dimensional Datasets Symposium, Materials Science and Technology 2021** October 17-21, 2021. <https://www.matscitech.org/MST21>.
158. Roger H. French, Invited: Degradation Science and Lifetime Extension for Complex Materials Systems: Applying Spatiotemporal-Graph Learning at Scale with Time-series, Spectral and Image Datasets, **Sandia Materials Reliability and Aging Seminar**, Sandia National Labs, December 13th, 2021.

2020

157. R. H. French, Invited: c-Si Photovoltaic Module Degradation Across Stressors and Climate Zones: Doing Materials Data Science at Scale with Time-series and Image Datasets, **Materials Science Department Seminar, NC State University**, Raleigh NC, Feb. 8th, (2020).
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153. Roger H. French, Menghong Wang, Sameera N. Venkat, JiQi Liu, Alan Curran, Laura S. Bruckman, Jennifer L. Braid, Invited: Degradation of PERC and Al-BSF Photovoltaic Cells with Differentiated Minimodule Packaging Materials, **NIST/UL Workshop on Photovoltaic Materials Durability**, Gaithersburg MD, Dec. 12-13, 2019. <https://www.nist.gov/news-events/events/2019/12/nistul-workshop-photovoltaic-materials>

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150. R. H. French, Invited: Data Science Studies of Photovoltaic Power Plants’ Lifetime Performance: Time Series, Image and Spectral Analytics for PV Module Degradation Pathways, **Electrical Engineering and Computer Science Department Seminar, Case Western Reserve University**, Cleveland OH October 2, (2018).
149. R. H. French, Invited: Data Science Studies of Photovoltaic Power Plants’ Lifetime Performance: Time Series, Image and Spectral Analytics for PV Module Degradation Pathways, **Chemical Engineering Department Seminar, Ohio University**, Athens OH October 23, (2018).

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2016

147. Roger H. French. ”Reliability-Driven New Energy Materials Design: Informed by Big Data Analytics”. **DOE SunShot Energy Materials Network Workshop**, Washington DC, March 9th, (2016).
146. Roger H. French, Abdulkerim Gok, David K. Ngendahimana, Cara L. Fagerholm, Devin Gordon, Laura S. Bruckman, and Jiayang Sun. “Degradation Science Studies of Acrylic and Polyester Polymers: Predictive and Semi-gSEM Models of Degradation Under Multi-Factor Accelerated Weathering Exposures.” presented at **The Adhesives and Sealants Council 2016 Spring Convention**, New Orleans, LA, April 19, 2016.
145. Roger H. French. “Invited: Big Data Analytics: Statistical Analysis to Drive PV Reliability Research.” presented at the **2016 NSLSII & CFN Joint Users’ Meeting: Renewable Energies: Where Applied and Basic Sciences Meet**, Brookhaven National Lab, Upton New York, May 25, 2016. <https://usersmeeting.ps.bnl.gov/default.aspx?year=2016>.
- 1 Roger H. French, Invited: Electronic Structure of Al_2O_3 and its Anion and Cationic Brethren, **Symposium in Honor of Arthur Heuer**, Case Western Reserve University, Cleveland OH, 2016.
144. Roger H. French. “Big Data Analytics: Statistical Analysis to Drive PV Reliability Research.” presented at the **Cyberinfrastructure Day: Big Data and Machine Learning in 2016**, Case Western Reserve University, Cleveland OH, May 11, 2016.
143. Roger H. French. “Invited: Data Science and Analytics to Drive Photovoltaic Reliability and Lifetime Performance.” presented at **The 3rd CWRU-Tohoku Joint Workshop: Collaboration on Data Science Engineering**, Tohoku University, Sendai Japan, August 10, 2016.
142. Roger H. French. “Data Science and Analytics to Drive Photovoltaic Reliability and Lifetime Performance.” presented at the **Cleveland Big Data and Hadoop User Group**, Cleveland Museum of Natural History, Cleveland OH, September 12, 2016.
141. Roger H. French. “Invited: “Degradation Science and Temporal Analytics of Photovoltaic Energy Materials: A Data Science and Analytics Approach.” presented at the **Lehigh University, Department of Chemical and Biomolecular Engineering Colloquium**, Bethlehem PA, October 26, 2016.

140. Roger H. French, Invited: Degradation Science and Temporal Analytics of Photovoltaic Energy Materials: A Data Science and Analytics Approach, **Cybrid Technologies**, Suzhou China, Nov. 9, 2016.
139. Roger H. French, Invited: Degradation Science and Temporal Analytics of Photovoltaic Energy Materials: A Data Science and Analytics Approach, **School of Materials Science, Southeast University**, Nanjing China, Nov. 11, 2016.
138. Roger H. French, Invited: Degradation Science and Temporal Analytics of Photovoltaic Energy Materials: A Data Science and Analytics Approach, **School of Printing and Packaging, Wuhan University**, Wuhan China, Nov. 14, 2016.
137. Roger H. French, Invited: Degradation Science and Temporal Analytics of Photovoltaic Energy Materials: A Data Science and Analytics Approach, **School of Materials Science, Wuhan University of Technology**, Nov. 15, 2016.

2015

136. Roger H. French. n.d. "Van Der Waals Interactions and Hamaker Coefficients: At Atomically Abrupt Grain Boundaries in SrTiO₃ And In Intergranular Films in Re-M-O-N:Si 3N 4." Invited presentation at **The Amer. Ceram. Soc. Eng. Ceram. Div. Meeting**, Daytona Beach, FL, January 2015.
135. R. H. French, N. F. Steinmetz, V. A. Parsegian, and W. Y. Ching. "Upcoming BESAC Report - Challenges at the Frontiers of Matter and Energy: Transformative Opportunities for Discovery Science." Poster presented at the **DOE-BES-Biomolecular Materials Program, PIs Meeting**, Gaithersburg MD, August 3. <https://science.energy.gov/bes/mse/principal-investigators-meetings/>. (August 2015).
134. Roger H. French. 2015. "Mesoscale Evolution & Temporal Analytics of Photovoltaic Energy Materials: A Degradation Science Approach." Invited presented at **The Vacuum Society Meeting**, IPF, San Jose, CA, October 19 2015.
133. Roger H. French. "Degradation Science: A Data-Science Approach to Lifetime Performance of Building Envelope Materials". **Saint-Gobain 350th Anniversary - University Days**, Paris, June 9th, 2015. at <https://www.saint-gobain.com/en>
132. Roger H. French. "Degradation Science and Temporal Analytics of Photovoltaic Energy Materials: A Data Science and Analytics Approach", **Materials Science Dept. Seminar, Carnegie Mellon University**, Pittsburgh PA, (2015).
131. Roger H. French. "Energy-CRADLE Analytics", **Electric Power Systems Research Group, Sandia National Labs**, Albuquerque, NM, (2015).
130. Roger H. French. Energy Data Science & Analytics. **Tri-state Shale Summit**, Morgantown WV, (2015). at <https://www.tristateshalesummit.com/>
129. Roger H. French. "From Quanta to the Continuum: Opportunities for Mesoscale Science: New DOE-BES Report". **CWRU EMSE Dept. Seminar**, Cleveland OH (2015).
128. Roger H. French. "Mesoscale Evolution & Temporal Analytics of Photovoltaic Energy Materials: A Degradation Science Approach", **Vacuum Society Meeting, Industrial Physics Forum**, San Jose CA, (2015).
127. Roger H. French. "Photovoltaic Lifetime and Degradation Science: Using Data Science Approach". **GAF Corp. Tech Summit**, Parsippany NJ, (2015). at www.gaf.com
126. Roger H. French. "Quantitative van der Waals interactions and final stage mesostructure of heterogeneous systems". **Berkeley/LBNL BES Geochemistry Group 2015 Annual Meeting**, Berkeley CA, (2015).
125. Roger H. French. "Upcoming BESAC Report - Challenges at the Frontiers of Matter and Energy: Transformative Opportunities for Discovery Science". **DOE-BES-Biomolecular Materials Program, PIs Meeting**, Gaithersburg MD, (2015). at <https://science.energy.gov/bes/mse/principal-investigators-meetings/>

124. Roger H. French. "van der Waals Interactions and Hamaker Coefficients: At Atomically Abrupt Grain Boundaries in SrTiO₃ And In Intergranular Films in Re-M-O-N:Si₃N₄", **ACerS- Eng. Ceram. Meeting-Armor Symposium**, Daytona Beach FL, Jan. 27 (2015).

2014

123. French, R. H., Saint Gobain Materials Durability Workshop, "Lifetime and Degradation Science: a Data Science Approach," **Saint Gobain**, Boston. (April 2014).
122. French, R. H., Baker Hughes Distinguished Lecturers, "A Data Science Approach to Lifetime and Degradation of Components and Systems: Case Study From Photovoltaic Power Plants," **Baker Hughes Company**, Houston TX. (April 2014).
121. French, R. H., Mini-Symposium on Molecular Biophysics, "Long Range Interactions: vdW, Polar and Electrostatics," **National Institutes of Health**, Bethesda, MD. (May 28, 2014).
120. French, R. H., SOPHIA PV-Reliability Workshop, "A Data Science Approach to Time Series Analysis of Real-World PV Modules", **Fraunhofer-ISE**, Freiburg, Germany. (June 2014).
119. Y. Xu, N. R. Wheeler, Y. Hu, M. A. Hossain, A. Gok, V. Y. R. Gunapati, Y. Hou, P. Zhao, H. M. Lemire, L. S. Bruckman, T. J. Peshek, G.-Q. Zhang, J. Sun, & R. H. French. Photovoltaic Lifetime and Degradation Science: a Data Science Approach. (2014). at <https://www.ise.fraunhofer.de/en/events-and-trade-fairs/2014/6th-world-conference-on-photovoltaic-energy-conversion-wcpec-6> Invited presented at the **WCPEC-6**, Kyoto Japan, November. 2014
118. Roger H. French. 2014. "Photovoltaic Lifetime and Degradation Science: A Data Science Approach." Invited, **Uni-Humboldt**, December 15, 2014.

2013

117. French, R. H., "Lifetime and Degradation Science: From Energy to Medical Devices and Engineering Education," **CWRU CSE Spring Seminar**, Nord 356. (March 25, 2013).
116. French, R. H., Indian Institute of Technology - Gandhinagar, "Engineering Outdoor Exposed Technologies for Lifetime Performance: Statistical and Domain Analytics Applied to PV Module Lifetime and Degradation Science," **Indian Institute of Technology - Gandhinagar (IIT-GN)**, Ahmedabad, Gujarat India. (July 2013)
115. Roger H. French. "From Quanta to the Continuum: Opportunities for Mesoscale Science (BESAC Report)." Invited presentation at the **DOE-BES-Biomolecular Materials Program**, PIs Meeting, Gaithersburg MD, August 19. <https://science.energy.gov/bes/mse/principal-investigators-meetings/>. (August 2013).
114. French, R. H., Korean PV Society Annual Meeting, "Lifetime and Degradation Science of Photovoltaic Performance: a Data Science Approach," **Korean PV Society**, Jeju, Korea. (November 2013).
113. French, R. H., "Lifetime and Degradation Science of Acrylic and PV Modules: Data Science Approach", **NIST/Atlas PV Polymers Workshop**, NIST, Washington DC. (November 2013).
112. French, R. H., 3M Global TechCon Seminar, "Lifetime and Degradation Science: a Data Science Approach," **Corporate Analytical Seminar, 3M Co.**, Minneapolis Minn. (December 2013).

2012

111. R. H. French, "Optical Material Science: Electrodynamics of Nanoscale Assembly and Lifetime and Degradation Science for Photovoltaics", 10th INANO Annual Meeting 2012, Aarhus University, Denmark, Jan. 18th 2012.
110. R. H. French, "Mesoscale Science: Long Range Interactions, and Lifetime and Degradation Science", **Case Western Reserve University**, Physics Department Seminar, April 30th, 2012.

109. Roger H. French, Nicole F. Steinmetz, Rudolf Podgornik, Wai-Yim Ching, V. Adrian Parsegian, "Nanoscale Assembly by Manipulation of Long Range Interactions", **Sosman Award Symposium**, MS&T 2012, Pittsburgh PA, Oct. 7-11, 2012.

2011

108. R. H. French, "Low Concentration Photovoltaics: Reliability and Durability Issues", **2011 PV Module Reliability Workshop**, Golden, Colorado, Feb. 2011.
107. R. H. French, "Long Range Interactions and Electrodynamics of Nanoscale Assembly: Carbon Nanotubes", **241st American Chemical Society National Meeting**, Bob Good Symposium, March 2011, Anaheim, California.
106. R. H. French, "Optical Properties as the Bridge between the Atomistic and Continuum Perspectives for the Electrodynamic Long Range Interactions", **E-MRS Spring Meeting**, MACAN11 Symposium: Reconciling Atomistic and Continuum Approaches to Interfaces, Nice, France, May 2011.
105. R. H. French, "Long Range Interactions and Electrodynamics of Nanoscale Assembly: Carbon Nanotubes Symposium on Interfaces", Grain Boundaries and Surfaces from Atomistic and Macroscopic Approaches – Fundamental and Engineering Issues, **MS&T 2011**, Columbus OH, October 16-20, 2011.
104. R. H. French, "Optical Properties and Radiation Durability Metrics for Photovoltaic Materials, Components and Systems", **Case Western Reserve University**, Macromolecular Sciences and Chemical Engineering Departments Seminar, Oct. 21, 2011.
103. R. H. French, "Optical Properties and Radiation Durability Metrics for Concentrating Photovoltaic Materials, Components and Systems", Atlas/NIST Conference on Photovoltaic Materials Durability, Gaithersburg, Maryland, October 27- 28, 2011.

2010

102. R. H. French, " Electrodynamic of Nanoscale Assembly of Carbon Nanotubes and DNA", at the **International Workshop on Molecular Bionics - From Biomineralization to Functional Materials**, Schloss Ringberg, Germany, October 2010.

2008

101. R. F. Rajter, R. H. French, "van der Waals - London Dispersion Interactions For Metallic and Semiconducting Carbon Nanotubes from *ab initio* Uniaxial Optical Properties", American Ceramic Society, **32nd International Conference on Advanced Ceramics and Composites**. Daytona Beach, Florida, January 2008.
100. H. V. Tran, E. Hendrickx, R. H. French, D. J. Adelman, N. S. Rogado, M. Kaku, M. Mocella, J. J. Schmieg, C. Y. Chen, F. Van Roey, A. S. Bernfeld, R. A. Derryberry, "High Refractive Index Fluid Evaluations at 193 nm: Fluid Lifetime and Fluid/Resist Interaction Studies", **Chiba Conference**, Chiba, Japan, June 2008.
99. R. F. Rajter, R. H. French, "van der Waals - London Dispersion Interactions For Metallic and Semiconducting Carbon Nanotubes", **International Symposium on Ceramic Interfaces**, Santiago de Compostela, Spain, June 2008.
98. R. F. Rajter, R. H. French, "van der Waals - London Dispersion Interactions For Metallic and Semiconducting Carbon Nanotubes", **Kavli Institute for Theoretical Physics, University of California at Santa Barbara**, Program on "Theory and Practice of Fluctuation-Induced Interactions", October 2008.
97. R. H. French, "New Perspectives on London Dispersion Interactions and Hamaker Coefficients: At Atomically Abrupt Grain Boundaries in SrTiO₃ and in Intergranular Films in Re-M-O-N:Si₃N₄", **Kavli Institute for Theoretical Physics, University Of California at Santa Barbara**, Program on "Theory and Practice Of Fluctuation-Induced Interactions", October 2008.

2007

96. R. H. French, "New Perspectives on van der Waals – London Dispersion Interactions of Materials: Wetting, Graded Interfaces and Carbon Nanotubes", **E-MRS**, Strasbourg, France, May / June 2007.

2006

95. R. H. French, K. I. Winey, "Origins and Applications of London Dispersion Interactions in Polymers and Other Materials: Electronic Structure, Optical Properties and Chemistry", 28th **Australasian Polymer Society Meeting**, Rotorua, New Zealand, February 2006.
94. R. H. French, A. L. Shoe, R. C. Wheland, H. V. Tran, W. Qiu, J. Feldman, S. J. McLain, M. K. Yang, M. F. Lemon, D. J. Adelman, M. K. Crawford, M. Ercken, R. Gronheid, J. Versluijs, E. Hendrickx, P. Foubert, N. Vandebroek, P. Willems, F. Van Roey, C. Jehoul "Second Generation Fluids for 193 nm Immersion Lithography: Optics, Imaging and Fluid Lifecycle", **International Sematech Lithography Forum**, Vancouver, British Columbia, Canada, May 2006.
93. R. H. French, A. L. Shoe, R. C. Wheland, H. V. Tran, W. Qiu, J. Feldman, S. J. McLain, M. K. Yang, M. F. Lemon, D. J. Adelman, M. K. Crawford, "Second Generation Fluids for 193 nm Immersion Lithography: Optics, Imaging and Fluid Lifecycle", **IEEE Lithography Workshop**, Prince Edward Island, Canada, July 2006.
92. R. H. French, "New Perspectives on London Dispersion Interactions and Hamaker Coefficients: At Atomically Abrupt Grain Boundaries in SrTiO₃ and of Compositional Gradients in Intergranular Films in Re-M-O-N:Si₃N₄", **Oak Ridge National Labs**, June 2006.
91. R. H. French, "New Perspectives on van der Waals – London Dispersion Interactions of Materials: Wetting, Graded Interfaces and Carbon Nanotubes", Department Seminar in Theoretical and Applied Mechanics, **Cornell University**, October 2006.

2005

90. R. H. French, G. L. Tan, "New Perspectives on London Dispersion Interactions and Hamaker Coefficients: At Atomically Abrupt Grain Boundaries in SrTiO₃ and of Compositional Gradients in Intergranular Films in Re-M-O-N:Si₃N₄" Symposium on Theoretical and Experimental Developments in the Understanding of Interface Stabilized Intergranular and Surficial Films: Progress from the NANOAM Project, **American Ceramics Society** Annual Meeting, Baltimore, April 2005.
89. R. H. French, "New Perspectives on London Dispersion Interaction and Hamaker Coefficients", **6th International Workshop on Interfaces: Interfaces by Design**, Santiago de Compostela, Spain, June 2005.

2004

88. R. H. French, "Structure – Composition - Property Relations for Transparency of Fluoromolecular Fluids For Nanoscale Patterning Using 157 nm Immersion Lithography", Materials Science Seminar Series, **University of Pennsylvania**, March 2004.
87. R. H. French, M. F. Lemon, S. Peng, W. Qiu, R. C. Wheland, M. K. Yang, "Fluids For 157 nm Immersion Lithography", **Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN)**, San Diego, June 2004.

2003

86. R. H. French, "Materials for Moore's Law: Ceramic Opportunities", **International Nanotechnology Symposium for World Young Ceramists** Kagoshima, Japan, January 2003.
85. R. H. French, "Electronic Structure, Optical Properties and Dispersion Forces at Interfaces in Materials" presented at the **American Ceramic Society** Annual Meeting. Nashville TN, April 2003.
84. R. H. French, "Materials for Moore's Law", Complex Materials Seminar Series, Dept. of Chemical Engineering, **Princeton University**, April 2003.

83. R. H. French, "Lithography Materials for Semiconductor Manufacture", presented at "The Fifth Annual TC 1700 Technology Fair" of **The United States Patent and Trademark Office, Patent Technology Center 1700**, Alexandria, July 2003.

2002

82. R. H. French, "Optical Properties and Electronic Structure: London Dispersion Forces and Intergranular Films in Ceramics", **University of Cambridge**, Department of Materials Science and Metallurgy Seminar, January 2002.
81. R. H. French, L. K. Denoyer, V. A. Parsegian, R. Podgornik, "London Dispersion Forces and Full Spectral Hamaker Coefficients for Nanostructured Amorphous Films with Multilayer or Graded Structures", **International Workshop on Ceramic and Metal Interfaces**, Oviedo, Spain, June 2002.
80. R. H. French, L. K. Denoyer, V. A. Parsegian, R. Podgornik, "London Dispersion Forces and Full Spectral Hamaker Coefficients for Nanostructured Amorphous Films with Multilayer or Graded Structures", Workshop on Nanostructured Amorphous Films, **Massachusetts Institute of Technology**, Boston, MA, August 2002.
79. R. H. French, "Materials For Moore's Law", **Gordon Research Conference on Solid State Studies in Ceramics**, New Hampshire, August 2002.
78. R. H. French, R. C. Wheland, W. Qiu, M. F. Lemon, E. Zhang, J. Gordon, "Novel Hydrofluorocarbon Polymers for use as Pellicles in 157 nm Semiconductor Photolithography", **American Chemical Society**, Symposium on Fluorine in Microlithography and Microchip Manufacture, Boston, August 2002.
77. R. H. French, "Samuel Geijsbeek Award Lecture: Development of Attenuating Phase Shift Materials and Microstructures for Low k_1 Semiconductor Photolithography" **American Ceramic Society**, Fall Meeting, Seattle, October 2002.

2001

76. R. H. French, "vdW and London Dispersion Forces: an Electronic Structure and Chemistry Perspective on Wetting Films", Laboratory of Physical and Structural Biology, **National Institutes of Health**, Bethesda MD, June 2001.
75. R. H. French, "Challenges in Metal-Ceramic Interfaces in Semiconductors for Sub-90 nm and Sub 50nm Electronics", **CECAM Workshop on Ceramic-Metal Interfaces: Progress and Challenges**, Lyon, France, October 2001.
74. R. H. French, "Optical Properties and Electronic Structure: London Dispersion Forces and Intergranular Films in Ceramics", Service de Physique et Chimie, DSM-DRECAM-SPCSI **Commissariat a L'Energie Atomique**, Saclay, France, October 2001.
73. R. H. French, "Optical Properties and Electronic Structure: London Dispersion Forces and Intergranular Films in Ceramics", Groupe Physique du Metal, LTPCM/ENSEEG/CNRS, **Centre National de la Recherche Scientifique**, Grenoble, France, October 2001.
72. R. H. French, "Materials for Moore's Law: Nanostructures Galore", **University of Washington**, Materials Science Department Seminar, November 2001.

2000

71. R. H. French, "vdW and London Dispersion Forces: an Electronic Structure and Chemistry Perspective on Wetting Films", Condensed Matter Seminar Series, **Harvard University**, April 2000.
70. R. H. French, "Development of Novel Thin Films Materials and Microstructures for Phase Shift Photomasks and Low k_1 IC Lithography, **American Ceramic Society**, Annual Meeting, St. Louis, May 2000.

69. R. H. French, "Materials and Microstructure Design for Low k_1 , Semiconductor Photolithography to Produce Sub-wavelength Features", **Pennsylvania State University**, Materials Science Departmental Seminar, December 2000.

68. R. H. French, "Materials and Microstructure Design for Low k_1 , Semiconductor Photolithography to Produce Sub-wavelength Features", **Max Planck Institut fur Metallforschung**, Stuttgart, Germany, December 2000.

1999

67. R. H. French, "vdW Dispersion Forces: an Electronic Structure and Chemistry Perspective", Fulrath Award Seminar, Ceramic Society of Japan, Annual Meeting, **Seikei University**, Kissyo-Ji, Tokyo, March 1999.

66. R. H. French, "vdW Dispersion Forces: an Electronic Structure and Chemistry Perspective", **Kyoto University**, Kyoto, Japan, March 1999.

65. R. H. French, "vdW Dispersion Forces: an Electronic Structure and Chemistry Perspective", **Japan Fine Ceramics Center**, Nagoya, Japan, March 1999.

64. R. H. French, "vdW Dispersion Forces: an Electronic Structure and Chemistry Perspective", **Shonan Institute**, Tokyo, Japan, March 1999.

63. R. H. French, "SiN/TiN Multilayers for 248nm and 193 nm Phase Shift Lithography", **Taiyo Yuden Research Center**, Haruna, Gunma, Japan, March 1999.

62. R. H. French, "SiN/TiN Multilayers for 248nm and 193 nm Phase Shift Lithography", **Fujitsu VLSI Division**, Mie, Japan, March 1999.

61. R. H. French, "Near Field Optics for Scattering of Electromagnetic Radiation by Complex Particulate Microstructures", **Fujitsu VLSI Division**, Mie, Japan, March 1999.

60. R. H. French, "vdW Dispersion Forces: an Electronic Structure and Chemistry Perspective", **NEC Corporate Research Labs**, Tokyo, Japan, April 1999.

59. R. H. French, "vdW Dispersion Forces: an Electronic Structure and Chemistry Perspective", **Waseda University and Fulrath Foundation**, Tokyo, Japan, April 1999.

58. R. H. French, "vdW Dispersion Forces: an Electronic Structure and Chemistry Perspective", **University of Tokyo**, Tokyo, Japan, April 1999.

57. R. H. French, "Near Field Optics for Scattering of Electromagnetic Radiation By Complex Particulate Microstructures", **Gordon Research Conference on Solid State Studies in Ceramics**, August 1999.

56. R. H. French, "Near Field Optics of Resonant Scattering by Particulate Systems", **Acta Materialia International Workshop on Ceramic and Bimaterial Interfaces**, Seville, Spain, September 1999.

55. R. H. French, "Near Field Optics and Scattering By Particulate Dispersions", **Max Planck Institut fur Metallforschung**, Stuttgart, Germany, September 1999.

54. R. H. French, "Near Field Optics and Scattering By Particulate Dispersions", Theoretical and Applied Physics Institute, Physics Department, **University of Stuttgart**, Stuttgart, Germany, October 1999.

53. R. H. French, "Near Field Optics and Scattering by Particulate Dispersions", Ceramic and Materials Engineering Department, **Rutgers University**, November 1999.

1998

52. R. H. French, "VdW Dispersion Forces: An Electronic Structure and Chemistry Perspective", International Workshop on Interfaces in Alumina, **Max Planck Institut fur Metallforschung**, Schloss Ringberg, Germany, March 1998.

51. R. H. French, "Optical Property Based Electronic Structure Probes Applied to Intergranular Films and Wetting in Silicon Nitride", **University of Michigan**, March 1998.
50. R. H. French, "Resonant Scattering of Electromagnetic Radiation by Complex Particulate Microstructures", **International Workshop on Interfaces**, Santa Barbara, CA, April 1998.
49. R. H. French, "vdW Dispersion Forces: An Electronic Structure and Chemistry Perspective", Fulrath Award Presentation, **American Ceramic Society**, Annual Meeting, Cincinnati, OH, May 1998.
48. R. H. French, "Scattering of Electromagnetic Radiation by Complex Microstructures in the Resonant Regime", **Max Planck Institut fur Metallforschung**, Stuttgart, Germany, December 1998.
47. R. H. French, "SiN/TiN Multilayers for 248 nm and 193 nm Phase Shift Lithography", **Max Planck Institut fur Metallforschung**, Stuttgart, Germany, December 1998.

1997

46. R. H. French, "Optical Property Based Electronic Structure Probes: Vacuum Ultra Violet and Spatially Resolved-Valence Electron Energy Loss Spectroscopies", Material Science Department, **University of Washington**, February 1997.
45. R. H. French, "Optical Property Based Electronic Structure Probes: Vacuum Ultra Violet and Spatially Resolved-Valence Electron Energy Loss Spectroscopies", Material Science Department, **University of Toronto**, February 1997.
44. R. H. French, "Optical Property Based Electronic Structure Probes: Vacuum Ultra Violet and Spatially Resolved-Valence Electron Energy Loss Spectroscopies", Material Science Department, **University of Pennsylvania**, February 1997.
43. R. H. French, "Optical Property Based Electronic Structure Probes: Vacuum Ultra Violet and Spatially Resolved-Valence Electron Energy Loss Spectroscopies", Material Science Department, **Stevens Institute of Technology**, April 1997.

1996

42. R. H. French, "Design and Development of Cr-O_xC_yN_z Embedded Phase Shifter Photomask Blanks for I-Line Phase Shift Lithography", Materials Department, **University of California at Santa Barbara**, February 1996.
41. R. H. French, "Interfacial Electronic Structure and Interband Transitions: for Grain Boundary Bonding and Hamaker Constants of Intergranular Films", Materials Department, **University of California at Santa Barbara**, February 1996.
40. R. H. French, "Optical Property Based Electronic Structure Probes: Vacuum Ultra Violet and Spatially Resolved-Valence Electron Energy Loss Spectroscopies", **American Ceramic Society**, Annual Meeting, Indianapolis, April 1996.
39. R. H. French, "Design and Development of Cr-O_xC_yN_x, Embedded Phase Shifter Photomask Blanks for I-line Phase Shift Lithography", **American Ceramic Society**, Annual Meeting, Indianapolis, April 1996.
38. R. H. French, "Design and Development of Cr-O_xC_yN_z Embedded Phase Shifter Photomask Blanks for I-Line Phase Shift Lithography" Metallurgy Division, **National Institute for Standards and Technology**, April 1996.
37. R. H. French, "Design and Development of Cr-O_xC_yN_z Embedded Phase Shifter Photomask Blanks for I-Line Phase Shift Lithography", Physics Department, **Johns Hopkins University**, May 1996.
36. R. H. French, "Intergranular Film Chemistry, Hamaker Constants and Dispersion Forces in Silicon Nitride", **Third International Workshop on Interfaces: Wetting, Fracture and Chemistry of Interfaces**, University of Santiago, Santiago de Compostela, Galicia, Spain, September 1996.

35. R. H. French, "Dispersion Forces, Hamaker Constants and Intergranular Film Chemistry in Silicon Nitride", **Max Planck Institut fur Metallforschung**, Stuttgart, Germany, September 1996.
34. R. H. French, "Optical Property Based Electronic Structure Probes: Vacuum Ultra Violet and Spatially Resolved-Valence Electron Energy Loss Spectroscopies", Material Science Department, **Northwestern University**, November 1996.
33. R. H. French, "Design and Development of Cr-O_xC_yN_z Embedded Phase Shifter Photomask Blanks for I-Line Phase Shift Lithography", Material Science Department, **Northwestern University**, November 1996.

1995

32. R. H. French, "Quantitative Analysis of Spatially Resolved Valence Electron Energy Loss Spectra for Electronic Structure and Bonding Studies of Grain Boundaries and Thin Glass Films", Materials Science Department, **University of California at Berkeley**, January 1995.
31. R. H. French, "Quantitative Analysis of Spatially Resolved Valence Electron Energy Loss Spectra for Electronic Structure and Bonding Studies of Grain Boundaries and Thin Glass Films", Physics Department, **University of Missouri-Kansas City**, February 1995.
30. R. H. French, "Interfacial Electronic Structure and Bonding Studies of Grain Boundaries and Thin Glass Films", Materials Science Seminar Series, **Harvard University**, March 1995.
29. R. H. French, "Electronic Structure and van der Waals Dispersion Forces for Intergranular Films in Ceramics", **Gordon Conference on Solid State Studies in Ceramics**, New Hampshire, July 23, 1995.
28. R. H. French, "Quantitative Analysis of Spatially Resolved Valence Electron Energy Loss Spectra for Electronic Structure and Bonding Studies of Grain Boundaries and Thin Glass Films", Symposium on Analytical Microscopy of Ceramics, **Microscopy Society of America**, Kansas City, August 1995.

1994

27. R. H. French, "Electronic Structure and Interband Transitions of Ceramics: Critical Point Analysis of AlN and Al₂O₃, Hamaker Constants and Spatially-Resolved EELS", Materials Science Department, **Massachusetts Institute of Technology**, January 1994.
26. R. H. French, "Interband Electronic Structure and Interfaces: Bonding and Hamaker Constants", International Symposium on "Interfaces in Ionic Materials", **Max Planck Institut fur Metallforschung**, held at Schloss Ringberg, Germany, March 6 to 11, 1994.
25. R. H. French, "Embedded Phase Shifter Photomask Blanks: Materials Development", International Symposium on "Interfaces in Ionic Materials", **Max Planck Institut fur Metallforschung**, held at Schloss Ringberg, Germany, March 6 to 11, 1994.
24. R. H. French, "Optical Properties and Electronic Structure of Polysilanes and Other Materials", **University of Connecticut**, Polymer Science Program, Institute of Materials Science, April 1994.
23. R. H. French, "Spectroscopic Determination of Interfacial Electronic Structure for Interatomic Bonding and Hamaker Constants", Symposium on Structure and Properties of Interfaces in Ceramics, **Materials Research Society** 1994 Annual Fall Meeting, Boston, MA, December 1994.

1993

22. R. H. French, "Optical Spectroscopy and Electronic Structure of α -Al₂O₃", International Symposium on the Science of α -Al₂O₃, **Max Planck Institut fur Metallforschung**, held at Schloss Ringberg, Germany, April 15 to 19, 1993.

21. R. H. French, "Vacuum Ultraviolet Spectroscopy of the Electronic Structure and Interband Transitions of Ceramics: AlN, Al₂O₃, and ZrO₂", **Cornell University**, Materials Science Dept., October 1993.

1992

20. R. H. French, "High Temperature Electronic Structure of Insulating Oxides", **University of North Carolina, Chapel Hill**, Physics and Astronomy Dept., February 1992.
19. R. H. French, "Vacuum Ultraviolet Spectroscopy of the Electronic Structure and Interband Transitions of Ceramics: AlN, Al₂O₃, and ZrO₂", **Max Planck Institut fur Metallforschung**, Stuttgart, Germany, July 1992.
18. R. H. French, "Vacuum Ultraviolet Spectroscopy of the Electronic Structure and Interband Transitions of Ceramics: AlN, Al₂O₃, and ZrO₂", **Royal Institution**, London, England, July 1992.
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14. R. H. French, "High Temperature Electronic Structure of Ceramics", American **Ceramic Society**, Basic Science Division Fall Meeting on Atomic Bonding and Properties of Ceramics, Marco Is., Florida, October 1991.

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13. R. H. French, "Electronic Structure and Optical Properties of Ceramics and Optical Materials", **University of Missouri, Kansas City**, April 1990.
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11. R. H. French, "Band Structure of Alumina", Case Western Reserve/NASA/DuPont Workshop on Alumina, **Case Western Reserve University**, January 1989.

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10. R. H. French, "VUV Spectroscopy of the Electronic Structure of Ceramics", Department of Materials Science, **University of Pennsylvania**, March 1988.
9. R. H. French, D. J. Jones, W. Y. Hsu, B. A. Yost, M. A. Subramanian, "Percolation Effects in the Dielectric Properties of Polymer Ceramic Composites", **American Ceramic Society Annual Meeting, Cincinnati, OH**, May 1988.
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3. R. H. French, "Application of Vacuum Ultraviolet Absorption Spectroscopy to Optical Materials", Crystal Physics and Opto-Electronics Seminar Series, **Massachusetts Institute of Technology**, May 1986.
2. R. H. French, "Temperature Dependence of the Electronic Structure of Al_2O_3 ", Solid State Division Seminar, **Oak Ridge National Labs**, June 1986.
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395. F. Holt, SHAKE: Sample Handling and Analysis Kit for Experiments, MS&T24 Technical Meeting and Exhibition (2024).
394. Anthony Lino, Kristen Hernandez, Austin Ngo, Tu Pham, Roger H. French, Pawan Tripathi, John Lewandowski, Laura S. Bruckman, Feature Extraction from SEM Images of Fatigue Fracture Surfaces, MS&T24 Technical Meeting and Exhibition (2024).
393. H. Aung, B.P. Rajamohan, Transferability of Workflow in Direct Ink Write Printing and Analysis, MS&T24 Technical Meeting and Exhibition (2024).
392. Q.D. Tran, O. Dernek, E.I. Barcelos, L.S. Bruckman, R.H. French, Knowledge Management and Semantic Reasoning: Ontology and Information Theory Enable the Construction of Knowledge Bases and Knowledge Graphs, 10th Annual CWRU-Tohoku University Data Science in Engineering and Life Sciences Symposium (2024).
391. Q.D. Tran, A.H. Bradley, B.P. Rajamohan, J.E. Gordon, V.D. Tran, K. Lin, E.I. Barcelos, L.S. Bruckman, R.H. French, Knowledge Management of Historical Data: Ontology Development for Chemical Reactions, 10th Annual CWRU-Tohoku University Data Science in Engineering and Life Sciences Symposium(2024).
390. J. Bachman, M.R. Mehdi, O. Dernek, W. Yue, G. Ponon, F. Holt, P.K. Tripathi, M.A. Willard, F. Ernst, R.H. French, An Ontology for Synchrotron X-ray Data FAIRification, 10th Annual CWRU-Tohoku University Data Science in Engineering and Life Sciences Symposium (2024).
389. Weiqi Yue, Qingzhe Guo, Pawan K. Tripathi, Donald W. Brown, An Wang, Roger H. French, Erman Ayday, A Federated Learning Approach with Quality Control for Synchrotron XRD Data, 10th Annual CWRU-Tohoku University in Engineering & Life Sciences (2024).
388. V.D. Tran, J.E. Gordon, Materials Data Science Ontology (MDS-Onto): Unifying Domain Knowledge in Materials and Applied Data Science, 10th Annual CWRU-Tohoku University in Engineering & Life Sciences(2024).
387. An Wang, 24-Tohoku-presentation:Federated Learning Approaches: Data-decentralized Analysis on Synchrotron X-ray Diffraction Data and LPBF Data, (2024).

386. R. Wieser, B. Pierce, Y. Fan, A. Nihar, L. Bruckman, R. French, PV-stGNN: Developing Methodologies for extracting insight from Graph Machine Learning, 10th Annual CWRU-Tohoku University in Engineering & Life Sciences (2024).
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367. A.H. Bradley, Enabling Data-Centric AI for Material Science using FAIRification and Knowledge Graphs, Stewardship Science Academic Alliances SSAP Symposium (2024).
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1990

41. M. L. Bortz, R. H. French, D. J. Jones, R. V. Kasowski, F. S. Ohuchi, "Temperature Dependence of the Electronic Structure of MgO and α -Al₂O₃", Symposium on Electronic Structure of Ceramics, American Ceramic Society, Dallas TX, April 1990.
40. R. H. French, M. K. Crawford, M. L. Bortz, R. D. Shannon, "Spectroscopic Determination of the Dielectric Constant of MgAl₂O₄ Spinel from 10¹¹ to 10¹⁶ Hz", Symposium on Electronic Structure of Ceramics, American Ceramic Society, Dallas TX, April 1990.
39. R. H. French, F. S. Ohuchi, M. K. Crawford, P. A. Morris, "Optical Properties and Electronic Structure of KTiOPO₄ Non-linear and Electro-optic Crystals", American Physical Society, Anaheim, CA, March 1990.
38. D. A. Bonnell, G. Rohrer, R. H. French, "Spatially Resolved Defect Analysis of Oxides by Photoconduction Scanning Tunneling Microscopy", Symposium on Electronic Structure of Ceramics, American Ceramic Society, Dallas TX, April 1990.
37. B. K. Flint, R. D. Fancy, R. H. French, "Development of New VUV Optics, Instrumentation and a Laser Produced Plasma Source", Engineering Foundation Conference on Future Prospects and Applications of UV and VUV Lasers, Santa Barbara, CA, March 1990.
36. S. Loughin, R. H. French, G. A. Slack, J. B. Blum, "A Vacuum Ultraviolet Investigation of the Electronic Structure of Single- and Poly-crystalline Aluminum Nitride", Symposium on Covalent Ceramics at the Materials Research Society Fall Meeting, December 1990.
35. F. M. Schellenberg, R. L. Byer, R. H. French, R. D. Miller, S. Kano, Y. Takahashi, "Linear and Nonlinear Optics of Polysilanes", 33rd IUPAC International Symposium on Macromolecules, Montreal, Canada, July 1990.
34. D. A. Bonnell, G. S. Rohrer, R. H. French, "Tunneling Spectroscopy Analysis of Optically Active States in Wide Band Gap Semiconductors", Fifth International STM Conference of the American Vacuum Society, Baltimore, Md., July 1990.

1989

33. R. H. French, D. J. Jones, H. Song, R. L. Coble, "High Temperature Electronic Structure of MgO", Amer. Phys. Soc. Spring Meeting, St. Louis, March 20-24, 1989.
32. J. D. Bolt, R. H. French, D. P. Button, W. Y. Hsu, D. J. Jones, B. A. Yost, "Polymer-Ceramic Composites: Optimizing Morphology, Microstructure and Materials Selection", Mater. Res. Soc. Spring Meeting, San Diego, April 24-29, 1989.
31. P. A. Morris, M. K. Crawford, R. H. French, M. G. Roelofs, J. D. Bierlein, J. B. Brown, "Defects in KTiOP₄", Mater. Res. Soc. Spring Meeting, San Diego, April 24-29, 1989.

30. V. C. Long, R. H. French, F. S. Ohuchi, R. V. Kasowski, "Electronic Structure of ZrO_2 : Phase Stabilizing Dopants", American Ceramic Society Annual Meeting, Indianapolis, Ind., April 23-27, 1989.
29. M. L. Bortz, R. H. French, F. S. Ohuchi, "Optical Properties and Electronic Structure of $MgAl_2O_4$ ", American Ceramic Society Annual Meeting, Indianapolis, Ind., April 23-27, 1989.
28. D. A. Bonnell, R. H. French, "Observation of Defect Mediated Photoconduction in Ceramics Through the Tunneling Response of STM", University of Pennsylvania STM Spring Workshop, May 1989.
27. R. H. French, "Laser Plasma Sourced, Temperature Dependent, VUV Spectrophotometer using Dispersive Analysis", Ninth International Conference on Vacuum Ultraviolet Radiation Physics, Honolulu, Hawaii, July 1989.
26. R. H. French, M. L. Bortz, D. J. Jones, R. V. Kasowski, F. S. Ohuchi, "Temperature Dependence of the Electronic Structure of Oxides: Al_2O_3 , $MgAl_2O_4$ and MgO ", Ninth International Conference on Vacuum Ultraviolet Radiation Physics, Honolulu, Hawaii, July 1989.
25. R. H. French, D. E. Ellis, F. S. Ohuchi, V. C. Long, W. Y. Ching, D. J. Lam, "Electronic Structure and Phase Stabilizing Dopants in ZrO_2 : Experiment and Theory", International Zirconia IV Symposium, Ceramic Science and Technology Congress, Anaheim, CA, Oct. 31 - Nov. 3, 1989.

1988

24. R. H. French, D. J. Jones, D. P. Button, W. Y. Hsu, D. G. Onn, H. M. Zhang, R. E. Geidd, O. Guerrero, "Property Relationships in Polymer Ceramic Composites", Engineering Foundation Meeting on Advanced Materials and Processes for High Density Packaging, Santa Barbara, CA, March 1988.
23. D. G. Onn, H. M. Zhang, R. E. Geidd, O. Guerrero, W. Y. Hsu, R. H. French, "Percolation Effects in the Thermal Diffusivity of Polymer/Ceramic Composite Systems", American Ceramic Society, May 1988.
22. F. N. Tebbe, P. A. Morris, R. H. French, U. Chowdhry, R. L. Coble, "The Purity of Aluminum Hydroxide Derived From Triethylaluminum", International Forum on Sintering of Advanced Ceramics, American Ceramic Society, Cincinnati, OH, May 1988.
21. R. H. French, F. S. Ohuchi, C. T. Chen, J. W. Lin, "Electronic Structure of β - BaB_2O_4 and LiB_3O_5 : Experiment and Theory", American Ceramic Society Basic Science Fall Meeting, Symposium on Non-linear Optical Materials, San Francisco, October 21-23, 1988.
20. R. H. French, "Vacuum Ultraviolet Spectroscopy of Ceramics", American Ceramic Society Electronics Division Fall Meeting, Symposium on Advanced Characterization Techniques for Ceramics, San Francisco, October 21-23, 1988.
19. R. H. French, R. V. Kasowski, F. S. Ohuchi, D. J. Jones, H. Song, R. L. Coble, "Temperature Dependence of the Electronic Structure of MgO ", Symposium on Atomic Scale Calculations in Materials Science, Mater. Res. Soc. Fall Meeting, Boston, Nov. 29, 1988.

1987

18. H. Song, R. L. Coble and R. H. French, "Effect of Strain on the Electronic Structure of Alumina and MgO ", American Ceramic Society Annual Meeting, April 1987.
17. R. H. French and F. S. Ohuchi, "Oxygen Incorporation in AlN Thin Films: Optical Properties and Electronic Structure", American Ceramic Society Annual Meeting, April 1987.
16. F. A. Modine, C. Y. Allison, R. H. French, "Optical and Electrical Properties of Niobium and Tantalum Carbide", Materials Research Society, April 1987.
15. R. H. French, F. S. Ohuchi, "Use of Valence Band XPS for Electronic Structure Determination", Eastern Electron Spectroscopy Society, May 1987.

14. R. H. French, R. L. Coble, R. V. Kasowski and F. S. Ohuchi, "Vacuum Ultraviolet, Photoemission and Theoretical Studies of the Electronic Structure of Al_2O_3 up to 1000°C ", International Conference on Electronic Structure and Phase Stability in Advanced Ceramics, August 1987.
13. R. V. Kasowski, F. S. Ohuchi and R. H. French, "Metallization of AlN and Al_2O_3 : Theoretical and Experimental Study", International Conference on Electronic Structure and Phase Stability in Advanced Ceramics, August 1987.
12. D. P. Button, B. A. Yost, R. H. French, W. Y. Hsu, J. D. Bolt, M. A. Subramanian, H. M. Zhang, R. E. Geidd, A. G. Whittaker, D. G. Onn, "Thermally Conductive Composites with Low Dielectric Constants", American Ceramic Society Meeting on Electronic Packaging, Denver, October, 1987.
11. F. S. Ohuchi, R. H. French, "Effect of Oxygen Incorporation in AlN Thin Films", American Vacuum Society, November 1987.

1986

10. F. A. Modine, C. Y. Allison, T. W. Haywood, R. H. French, "Optical and Electrical Properties of Niobium Carbide", American Physical Society, Las Vegas, Nevada, April 4, 1986.
9. F. S. Ohuchi, R. H. French, R. V. Kasowski, "A Study of Room Temperature Cu- Al_2O_3 and Cu-AlN Interfacial Reactions", American Vacuum Society, Baltimore, November 1986.
8. F. S. Ohuchi, R. H. French, R. V. Kasowski, "Cu Deposition on Al_2O_3 and AlN Surfaces: Electronic Structure and Bonding", MRS Symposium on "Thin Film Overlayers and Surfaces", December 1986.

1985

7. R. H. French, R. L. Coble, "Temperature Dependence of the VUV Optical Spectra and Band Structure of Al_2O_3 ", Topical Conference on Basic Properties of Optical Materials, National Bureau of Standards, May 1985.
6. R. H. French, R. L. Coble, "Measurement of the High Temperature Band Gap of Al_2O_3 and Implications for High Temperature Conductivity", 87th Annual Meeting, Amer. Ceram. Soc., Cincinnati, Ohio, May 6, 1985.
5. P. A. Morris, R. H. French, R. L. Coble, F. N. Tebbe, U. Chowdhry, "Clean-room and CO₂-Laser Processing of Ultra High-Purity Al_2O_3 ", Materials Research Society Symposium on "Defect Properties and Processing of High-Technology Nonmetallic Materials", December 1985.

1984

4. R. H. French, R. L. Coble, "High Temperature Electronic Structure of Single Crystal Al_2O_3 ", 86th Annual Meeting, Amer. Ceram. Soc., Pittsburgh, Pennsylvania, May 3, 1984.

1983

3. R. H. French, R. L. Coble, "High Temperature Electronic Structure of Single Crystal Al_2O_3 ", 7th International Conference on Vacuum Ultraviolet Radiation Physics, Jerusalem, Israel, August 1983.
2. R. H. French, H. P. Jossen, and R. L. Coble, "High Temperature VUV Spectrophotometer", 7th International Conference on Vacuum Ultraviolet Radiation Physics, Jerusalem, Israel, August 1983.

1979

1. R. C. Koeller, R. H. French, R. Raj, "Use of Holographic Interferometry to Study Crack Propagation in Metal-Plastic Composites", Conference of Failure Modes in Composites IV, TMS-AIME, 1979.

AWARDS AND HONORS: RESEARCH

16. 2022 Outstanding Poster Award, Session B. Xuanji Yu, Cuiwei Wu, Ruirui Lv, Jean-Nicolas Jaubert, G. Zhang, L.S. Bruckman, Roger H French, Delamination Risk Prediction of POE and EPE Encapsulated PV Modules All Around World, PV Reliability Workshop, 2022. <https://www.nrel.gov/pv/pvrw.html>.
15. 2020 Recipient of Case Western Reserve University's [Faculty Distinguished Research Award](#).
14. 2020 Elevated to IEEE Senior Member.
13. 2020 Outstanding Poster Award. Alan J. Curran, Menghong Wang, E. J. Schneller, M. Martin, D. J. Colvin, N. Iqbal, J. Dai, J-N Jaubert, L. S. Bruckman, B. D. Huey, K. O. Davis, J. L. Braid, R. H. French, "Impact of Module Packaging Materials on Reliability and Power Degradation Mechanisms of Mono- and Multi-crystalline, Mono- and bifacial PERC Modules", NREL PV Reliability Workshop, Lakewood CO, February 27, 2020, <https://www.nrel.gov/pv/pvrw.html>.
12. 2019 Outstanding Poster Award. Alan J. Curran, Christian B. Jones, Sascha Lindig, Joshua Stein, David Moser, Roger H. French, "Performance Loss Rate Consistency and Uncertainty Across Multiple Methods and Filtering Criteria", in: **2019 IEEE 46th Photovoltaic Specialist Conference (PVSC)**, Chicago, IL, USA, 2019. <https://dx.doi.org/10.1109/PVSC40753.2019.8980928>
11. 2017 Recipient of the CWRU's, Case School of Engineering Research Award, 2017.
10. 2012 Best Technical Poster Award. Roger H. French, Laura S. Bruckman, Myles P. Murray, Samuel Richardson, Esther Deena, Scott A. Brown, Mark A. Schuetz, "Degradation of Acrylic Polymer and Acrylic Mirrors", NREL PV Module Reliability Workshop, Golden, CO, Feb. 28 – Mar. 1, 2012.
9. 2011 Appointed To U. S. Department of Energy, [Basic Energy Sciences Advisory Committee \(BESAC\)](#).
8. 2009 Nominated To U. S. Department of Energy, Basic Energy Sciences Advisory Committee (BESAC).
7. 2009 Best Concentrating Photovoltaics Poster Award. R.H. French, J.M. Rodríguez-Parada, M.K. Yang, R.A. Derryberry, M.F. Lemon, M.J. Brown, C.R. Haeger, S.L. Samuels, E.C. Romano, R.E. Richardson, Optical properties of materials for concentrator photovoltaic systems, in: 2009 34th IEEE Photovoltaic Specialists Conference (PVSC), 2009: pp. 000394–000399. Philadelphia, PA, (2009). <https://doi.org/10.1109/PVSC.2009.5411657>.
6. 2002 [Samuel Geijsbeek Award](#) of the American Ceramic Society, Pacific Coast Region.
5. 2002 Nominated to National Academy of Engineering's [Frontiers of Engineering Symposium](#).
4. 1999 [Fellow of the American Ceramic Society](#).
3. 1998 [Fulrath Award](#) of the American Ceramic Society and Ceramic Society of Japan.
2. 1995-1996 Nominated as Associate of the DuPont Fellows Forum.
1. 1989 [R & D 100 Award](#) for LPS-521 VUV-LPLS Spectrophotometer

PROPOSALS AND AWARDS

10.1 Proposal & Award Activity

10.1.1 Research Awards - Funded

Annualized Research Award Summary for Calendar Year

- \$2,826,110 Total for CY 2022
- \$5,080,000 Total for CY 2023

- \$3,831,401 Total for CY 2024

Total SDLE Award Expenditures Summary from 9/1/2010 to 12/31/2023

- \$27,700,000

Total SDLE Award value for all awards received

- \$42,700,000 Total
including current ongoing awards, 2011-2027

French as PI award expenditures, 2011 through 2023

- \$19.900,000

French: Principal Investigator

- R. H. French (PI), co-PIs: Laura S. Bruckman, Yinghui Wu, Erman Ayday, Vipin Chaudhary, Frank Ernst, Robert Gao, John Lewandowski, Ina Martin, Alp Sehirliglu, Anirban Mondal, An Wang, Matt Willard, Jeffrey Yarus, sub-award to Kristopher O. Davis (University of Central Florida), **DOE NNSA NA-113 Office of Experimental Research**, “Materials Data Science for Stockpile Stewardship: Materials Degradation & Lifetime Extension Center of Excellence at Case Western Reserve University”. With (unfunded) NNSA collaborators: LLNL: Kerri Blobaum, Manyalibo J. Matthews, Brian Giera, Jean-Baptiste Forien, Rick Gee, Scott McCall, Chris Orme, LANL: Donald W. Brown, John S. Carpenter Sandia: Ryan P. Haggerty, Eric Coker, Jonathan A. Bock, Philip J. Noell, Stephen C. Hwang, KCNSC: Mitchell Morrow, Debbie Hinkle, Jeffrey Renzelman, \$14,200,000 for 5 years, 2022.
- Roger H. French (PI), Vipin Chaudhary, **DOE-NNSA Kansas City Nuclear Security Campus (KCNSC)**, “Second Order Tester Security through Machine Learning Log Analysis” \$150,000 for 1 year, start: Sept. 2022. end: August 2023.
- M. Oakes, D. Freedman, R. French, “East Palestine Ohio, State of the Science Consortium”, \$25,000 for 6 months of spatiotemporal analytics.
- R. H. French, L. s. Bruckman, EU HORIZON FOA. “Operation and Maintenance and Grid Friendly Tools and Solutions for Solar Data Fusion and Insight Explosion for Reliable, Bankable, Circular PV Plants”, 42 months long. CWRU is unfunded collaborator on this large EU project. This project complements and dovetails with our proposed ArgoPV project.
- Roger H. French (co-PI), NSF ERC, “NSF ERC for Advancing Sustainable and Distributed Fertilizer Production (CASFER).” \$26M in NSF funds, \$5.2M in cost share, \$2,809,895 (CWRU portion) for 5 years. PI: Gerri Botte, Texas Tech; Co-PI: Roger H. French, Texas Tech University (TTU), Georgia Institute of Technology (GaTech), Massachusetts Institute of Technology (MIT), Case Western Reserve University (CWRU), and Florida A&M University (FAMU), 2021 Submission, 2022-Funded.
- Department of Energy: PVRD2, “Supplemental Funding for: Towards 50 Year Lifetime PV Modules: Double Glass (DB) vs. Glass/Backsheet (GB).” \$144,161, over 1 year. PI: RH French, Co-PI: LS Bruckman, William Gambogi (DuPont), Brent Brownell (Cybrid Technologies Americas), Philippe Gregoire (Canadian Solar USA), Jennifer Carter, Nick Bosco, (National Renewable Energy Laboratory), 2022.
- Roger H. French (PI), L. S. Bruckman, A. Sehirliglu, Y. Wu, F. Ernst, J. Yarus, J. J. Lewandowski, J. McGuffin-Cawley, **Department of Energy: National Nuclear Security Administration**, “Materials Degradation & Lifetime Extension (MDLE).” \$1,075,820 for 1 year, funded Sept. 15th, 2021.
- Roger H. French (PI), Laura S. Bruckman, “IUCRC Phase I Case Western Reserve University: Center for Materials Data Science for Reliability and Degradation (MDS-Rely)”, **National Science Foundation, Directorate for Engineering**, \$900,000, Funded (start: Sept. 1. 2021, end: August 31, 2026). Partners with University of Pittsburgh; PI: Paul Leu; Co-PI: Satish Iyengar, 2021.

20. Roger H. French (PI), Yinghui Wu, Mehmet Koyuturk, Laura S. Bruckman, Jennifer Braid, “Robust PV Performance Loss Rate Prediction: Using Spatiotemporal Graph Neural Network Models in a Reliable System-Topology-Aware Learning Framework”, **Department of Energy - Office of Energy Efficiency and Renewable Energy**, \$750,000, Funded. (start: April 1, 2021, end: March 30, 2024).
19. Roger H. French (PI), Laura S. Bruckman, “Gaining Fundamental Understanding of Critical Failure Modes and Degradation Mechanisms in Fielded Photovoltaic Modules via Multiscale Characterization”, **Department of Energy - Office of Energy Efficiency and Renewable Energy**. \$2.4 M for 4 years, PI: Kristopher Davis (UCF), CO-PI: Joseph Walters (UCF), Sudipta Seal (UCF), Mengjie Li (UCF), Tamil Selvan (UCF) Roger H. French (CWRU), Laura S. Bruckman (CWRU), Greg Horner (Tau Science), Andrew Gabor (BrightSpot Automation), Full proposal submitted June 2020, Funded April 1, 2021. \$500,000, CWRU subaward funded. (start: April 1, 2021, end: March 31, 2024).
18. Roger H. French, “Faculty Distinguished Research Award”, CWRU Honor, \$10,000, Funded. (start: April 1, 2020, end: March 31, 2021).
17. Roger H. French (PI), Alexis R. Abramson, Michael Goldberg, “Demonstration and Validation of A Virtual Energy Audit Tool for Buildings”, **Department of Energy - Advanced Research Projects Agency - Energy**, \$561,524, Funded. (start: October 1, 2020, end: September 30, 2023).
16. Roger H. French (PI), Laura S. Bruckman, Jennifer L. W. Carter, Jennifer L. Braid, “Towards 50 Year Lifetime”, **Department of Energy, EERE, Solar Energy Technologies Office**, \$1,350,000, Funded. (start: January 1, 2019, end: December 31, 2020).
15. Roger H. French (PI), Laura S. Bruckman, Nora Nock, “Influence of Employee Wellness”, **Bravo Wellness**, \$103,391, Funded. (start: January 1, 2019, end: December 31, 2019).
14. Roger H. French (PI), Laura S. Bruckman “Durability of Automotive Adhesive”, **Honda R&D Americas, Inc.**, \$148,518, Funded. (start: March 1, 2019, end: February 29, 2020).
13. Roger H. French (PI), Laura S. Bruckman, “Planning IUCRC at Case Western Reserve University: Center on Data Science for Materials Reliability and Degradation (MDS-Rely)”, **National Science Foundation**, \$15,000, Funded. (start: December 1, 2018, end: November 30, 2019).
12. Roger H. French (PI), Laura S. Bruckman, “PERC: Reliability and Power Degradation Rates of PERC Modules Using Differentiated Packaging Strategies and Characterization”, **Department of Energy - Office of Energy Efficiency and Renewable Energy**, \$1,465,291, Funded. (start: October 1, 2017, end: March 31, 2021).
11. Roger H. French (PI), “Nanoscale Performance Mapping of PERC Solar Cells for Network Modeling for Rapid Optimization of Lifetime, Efficiency, and CapEx of PERC Solar Cells”, **Bay Area Photovoltaic Consortium**, \$168,000, Funded. (start: September 1, 2016, end: April 30, 2018).
10. Roger H. French (PI), Jiayang Sun, Timothy J. Peshek, “Module Level Exposure and Evaluation Test for Real-world and Lab-based PV Modules: Common Data Analytics for Quantitative Cross-correlation and Validation”, **Department of Energy - Office of EERE, SETO**, \$1,350,000, Funded. (start: October 1, 2015, end: December 31, 2018).
9. Roger H. French (PI), Jiayang Sun, Laura S. Bruckman, “Backsheets: Correlation of Long-Term Field Reliability with Accelerated Laboratory Testing”, **Underwriters Laboratories, Inc.**, \$353,217, Funded. (sub: October 9, 2015, start: October 1, 2015, end: December 31, 2018).
8. Roger H. French, T. J. Peshek “Monitoring and Time Series Analysis of MCCo PV Power Plants”, **Medical Center Company (MCCo)**, Industry, \$80,087, Funded. (sub. January 24, 2014, start: February 1, 2014, end: January 31, 2017).
7. Roger H. French (PI), Kenneth D. Singer, Jiayang Sun, GQ Zhang, “PV Module Performance & Lifetime Prediction: Inserting New Technologies Without Lifetime Penalty”, **Bay Area Photovoltaic Consortium**, \$775,000.00. (sub: May 14, 2013, start: January 1, 2013, end: June 30, 2016)., (2013).

6. Roger H. French (PI), “Develop PV Degradation SEM Model for UL Material Degradation Study”, **Underwriters Laboratories, Inc.**, \$60,980, Industry, Funded. (sub: September 21, 2012, start: October 1, 2012, end: December 31, 2012).
5. R. H. French(PI), N. Steinmetz, ”Long Range van der Waals-London Dispersion Interactions for Biomolecular and Inorganic Nanoscale Assembly,” **Department of Energy - Office of Basic Energy Sciences**, Supplemental Funding \$29,375 Funded. (Start: April 1, 2013, End: April 1, 2016).
4. Roger H. French (PI), “Long Range van der Waals-London Dispersion Interactions for Biomolecular and Inorganic Nanoscale Assembly”, **Department of Energy - Office of Basic Energy Sciences**, \$500,000, Funded. (start: July 1, 2012, end: June 30, 2016).
3. Roger H. French (PI), Frank Ernst, Kenneth D. Singer, Jie Shan, “Solar Lifetime and Degradation Science of Photovoltaic Systems, Components and Materials”, **Underwriters Laboratories, Inc.**, Industry, \$500,000, Funded. (sub: December 21, 2010, start: January 1, 2012, end: December 31, 2014).
2. Roger H. French (PI), F. Ernst, D. A. Schiraldi, K. Singer, “Solar Durability and Lifetime Extension Center at CWRU”, **Ohio Third Frontier**, \$2,884,755, Funded. (start: July 11, 2011, end: July 11, 2014).
1. Roger H. French (PI), Frank Ernst, “Mirror-Augmented Solar Photovoltaic Systems: Durability and Lifetime Validation”, **Ohio Third Frontier**, \$1,596,688, Funded. (sub: January 28, 2011, start: March 14, 2011, end: March 13, 2013).

French co-PI or Sen. Pers.

25. Gerri Botte (PI), Texas Tech University (TTU), Georgia Institute of Technology (GT), Massachusetts Institute of Technology (MIT), Case Western Reserve University (CWRU), and Florida A&M University (FAMU), R. H. French (Co-PI), L. S. Bruckman, J. M. Yarus, Judy Zhang, Chris Yuan, Julie Renner, **National Science Foundation, Engineering Research Center**, “NSF ERC for Advancing Sustainable and Distributed Fertilizer Production (CASFER)”, \$26M in NSF funds, \$5.2M in cost share, \$2,809,895 (CWRU portion) for 5 years. Texas Tech University (TTU) with Georgia Institute of Technology (GT), Massachusetts Institute of Technology (MIT), Case Western Reserve University (CWRU), and Florida A&M University (FAMU), 2021.
24. RH French (PI), L. S. Bruckman (Co-PI): NSF: REU for NSF IUCRC MDS-Rely Center, ”**Summer Research Experience for Undergraduates in the NS IUCRC MDS-Rely Center at Case Western Reserve University**,” , \$76,500, 2022.
23. Roger H. French (PI), Co-PI: Laura S. Bruckman, William Gambogi (DuPont), Brent Brownell (Cybrid Technologies Americas), Philippe Gregoire (Canadian Solar USA), Jennifer Carter, Nick Bosco, (National Renewable Energy Laboratory), **Department of Energy, SETO: PVRD2**, “Supplemental Funding for: Towards 50 Year Lifetime PV Modules: Double Glass (DB) vs. Glass/Backsheet (GB).” \$144,161, over 1 year, 2022.
22. Vipin Chaudhary (PI), Jonathan Haines, Roger French, Roger Bielefeld, Anant Madabhushi “MRI: Acquisition of Artificial Intelligence Super Computer (AISC) for Accelerating Scientific Discovery”, **National Science Foundation, Office of Advanced Cyberinfrastructure (OAC), Major Research Instrumentation**, \$694,449, Funded (start: September 18, 2021, end: September 17, 2024).
21. L. S. Bruckman (PI), R. H. French, **DOE, Lawrence Livermore National Lab**, “Degradation Science Studies of Materials Aging: A Materials Data Science Approach, Infrastructure, Study Protocol and Data-driven Modeling.” \$99,922, 2021.
20. K. Boyce (UL), Co-PIs: Laura S. Bruckman (PI-CWRU), R. H. French(CWRU), M Kempe (NREL), G. O’Brien (Arkema), X Gu (NIST), W. Gambogi (DuPont), **Department of Energy, SETO: PVRD2**, “A Data-driven Approach to Real-world Degradation of Backsheets,” \$1.8M over 3 years, CWRU sub-award \$660,000 , August 2019.

19. Laura S. Bruckman (PI), Roger H. French, "IPF: Rapid Qualification", **The Sherwin-Williams Co.**, \$60,000, Funded. (start: October 2, 2017, end: April 1, 2018).
18. Laura S. Bruckman (PI), Roger H. French, Ina Martin, "Lifetime and Degradation Science of Coated Fly-Ash Loaded Polyurethane", **Saint-Gobain**, Industry, \$159,037, Funded. (Start: 10/1/2017 End: 9/30/2018).
17. Laura S. Bruckman (PI), Roger H. French, "Month-by-Month Power Change Rate Analysis of Canadian Solar Inverters", **Canadian Solar Inc.**, \$9,970, Funded. (Start: March 1, 2017, end: August 31, 2017).
16. Jennifer L.W. Carter (PI), Roger H. French, Laura S. Bruckman, "Rapid Qualification of New Fossil Energy Alloy Materials aided", **Department of Energy - National Energy Technology Laboratory**, \$273,749, Funded. (start: December 1, 2016, end: November 30, 2017).
15. Laura S. Bruckman (PI), Roger H. French, Ina Martin, "Lifetime and Degradation Science of Coated Fly-Ash Loaded Polyurethane", **Saint-Gobain**, Industry, \$132,000, Funded. (Start: 10/1/2016 End: 9/30/2017)
14. Timothy J. Peshek (PI), Ina T. Martin, Roger H French, Lorelle Mansfield, "Interfacial Work Function Modifiers in PV: a potentially disruptive science for extreme lifetime performance", **Department of Energy - Office of EERE**, \$165,798, Funded. (sub: October 19, 2015, start: May 1, 2016, end: April 30, 2017).
13. Laura S. Bruckman (PI), R. H. French "Lifetime and Degradation Science Studies of Outdoor Coatings with Sherwin Williams", **Sherwin Williams**, Industry, \$25,000, Funded. (sub:April 16, 2015, start: May 1, 2015, end: October 31, 2015).
12. Laura S Bruckman (PI), Roger H. French, "Lifetime and Degradation Science Studies of Exterior Coatings", **Sherwin Williams**, Industry, \$470,492, Funded. (sub: July 24, 2015, start: January 1, 2016, end: December 31, 2018).
11. Jennifer L.W. Carter (PI), Roger H. French, Laura S. Bruckman, "Rapid qualification of new FE alloy materials aided by data analytics", **URS Energy and Construction, Inc.**, \$115,784, Funded. (sub: November 24, 2015, start: January 1, 2016, end: June 30, 2016).
10. A. R. Abramson (PI), R. H. French, "Building Energy Efficiency via Virtual Energy Audits," **Cisco Systems**, \$400,000.00. (August 1, 2015 - August 1, 2017).
9. Alexis R. Abramson (PI), Roger H. French, "EDIFES: Mapping the Building Energy Genome for Virtual Energy Audits", **Department of Energy ARPA-E**, \$1,433,282, Funded. (sub: June 29, 2015, start: June 1, 2016, end: May 31, 2019).
8. L. S. Bruckman, (PI), R. H. French, "Lifetime and Degradation Science Studies of Outdoor Coatings with Sherwin Williams," **Sherwin Williams**, Industry. \$25,000 (Start: May 1, 2015 - End: October 31, 2015).
7. Timothy J. Peshek (PI), Roger H. French, Jennifer L.W. Carter, "Lifetime and Degradation Science of Coated Fly-Ash Loaded Polyurethane", **Saint-Gobain**, Industry, \$156,111, Funded. (Start: 10/1/2015, End: 9/30/2016).
6. Timothy J. Peshek (PI), Roger H. French, Laura S. Bruckman, "Lifetime and Degradation Science of Cholesteric LCD Screen Materials and Laminates for Kent Displays", **Kent Display Inc.**, Industry, \$63,733, Funded. (sub: October 1, 2014, start: December 1, 2014, end: November 30, 2015).
5. Timothy J. Peshek (PI), Roger H. French, Jennifer L.W. Carter, "Lifetime and Degradation Science of Coated Fly-Ash Loaded Polyurethane", **Saint-Gobain**, Industry, \$151,701, Funded. (Start: 11/01/2014, End: 10/31/2015).
4. Laura S. Bruckman (PI), Roger H. French, "Lifetime & Degradation Science of 3M PET: A Degradation Mechanism and Pathway Focus ", **3M Company**, Industry, \$480,000, Funded. (sub: May 12, 2014, start: July 1, 2014, end: June 30, 2017).

3. Timothy J. Peshek, and Roger H. French. “Monitoring and Time Series Analysis of MCCo PV Power Plants”, **Medical Center Company (MCCo)**, Industry, \$80,087, Funded. (Submission January 24, 2014, Start: February 1, 2014, End: January 31, 2017).
2. Timothy J. Peshek, and Roger H. French. “Lifetime and Degradation Science of Thin Film Silicon PV Modules for Solixel”, **Solixel Inc.**, Industry, \$217,095, Funded. (Start: November 15, 2013, End: November 14, 2015).
1. L. S. Bruckman (PI), R. H. French, Lifetime and Degradation Science of Acrylic Hardcoats for Automotive and Window Film Applications, **Saint-Gobain**, \$114,000 (Start: September 9, 2013, End: August 31, 2014).

10.1.2 Proposals Submitted - Under Review

10. R.H. French, L. S. Bruckman, Y. Wu, J. Ma, Argo PV: Orchestrating the Complete Photovoltaic Lifecycle Using Generative Artificial Intelligence and Spatiotemporal Graphs, \$4,000,000 for four years, DOE-SETO MORE-PV Topic 1 FOA (2024).
9. R.H. French, L. S. Bruckman, Developing a Circular Approach to Safely and Economically Reduce Material Usage and Environment Impacts During PV End-of-life Disposition., \$500,000 subaward from DOE-SETO MORE-PV Topic 2 FOA (2024).
8. R.H. French, D. Gordon, STTR Phase I: Autonomous Control of Distributed Energy Systems for Buildings, \$280,000 (2024).
7. R.H. French, E. Barcelos, Monitoring Nutrient Flows in Agricultural Systems Using Multi-scale Integrated Geospatiotemporal Analysis and Modeling, NASA Graduate Fellowship Application (2024).
6. Shane Parker, Lydia Kisley, Yinghui Wu, Laura S. Bruckman, Roger H. French, “Photobleaching and photodegradation of fluorophores” proposal to DOE-NNSA LLNL.
5. D. E. Gordon, R. H. French, Yinghui Wu, Alexis R. Abramson, **Proposal by Edifice Analytics Inc. to NSF SBIR/STTR program, with a subaward to CWRU SDLE Research Center**, “STTR Phase I: Autonomous Control of Distributed Energy Systems for Buildings”, \$280,000 for 1 year, with \$120,000 to CWRU, 2023.
4. R. H. French, L. S. Bruckman, Y. Wu, J. Ma, ”ArgoPV: Orchestrating the Complete Photovoltaic Lifecycle Using Generative Artificial Intelligence and Spatiotemporal Graphs”, in response to MORE PV Topic 1 FOA. \$4,000,000 for four years. US DOE EERE SETO. Submitted November 2023.
3. E. Daniels, REMADE Institute Prime, CWRU subaward to R. H. French, L. S. Bruckman, \$500,000 for 3 years in response to MORE PV Topic 2 FOA. submitted November 2023.
2. S. Rajagopalan PI, NIH “P20 Center for Climate Change and Health Research Center”, \$3,000,000, October 2023 submission.
1. R. H. French, Yinghui Wu, **CWRU Technology Validation and Start-up Fund Program, proposal in collaboration with Dave Gordon, Edifice Analytics Inc.**, “Site Energy System (SES): Autonomous Energy & Resilience Optimization for Distributed Solar Energy Systems of Residential & Commercial Buildings”, \$100,000 for 1 year total program cost, \$50,000 for 1 year from CTP program”

10.1.3 Proposals Submitted - Not Funded, Not an exhaustive list

54. L. S. Bruckman (PI), co-PI: Roger H. French, Jeffrey Yarus, **W. M. Keck Foundation, Research Program Phase I - D21**, “Discovery Science for Global Phenomena (DSGP) with Geospatiotemporal Statistics: Platform and Open Source Community for Scientific Discovery”, \$900,000 for 3 years, 2022.

53. Roger H. French (PI) (CWRU); Co-PI: Laura S. Bruckman (CWRU), Yinghui Wu (CWRU), Vipin Chaudhary (CWRU), Matthew Willard (CWRU), John Lewandowski (CWRU), Alp Sehirlioglu (CWRU), Jennifer Carter (CWRU), Ibo Matthews (LLNL), Chris Orme (LLNL), John Carpenter (LANL), Donald Brown (LANL), **Department of Energy, National Nuclear Security Administration (NNSA)**, "Generalized Framework for Spatiotemporal Feature Extraction from Beamline XRD and XCT Datasets: For Materials' Phase and Microstructural Transformations." \$899,457 for 3 years. 2021.
52. R. H. French(PI), "Novel small string inverter for photovoltaic applications," Sponsored by eQED, \$60,000.00. (January 1, 2012 - January 1, 2013). Not funded.
51. R. H. French(PI), Zhao, H. (Co-PI), "Reliability Testing of CIGS mini-modules," Sponsored by Ferro Corporation, \$240,000.00. (May 1, 2012 - May 1, 2015). Not funded.
50. R. H. French(PI), Zhao, H., "Hikari- Innovative Insolation Displacement," Sponsored by eQED, \$0.00. (July 11, 2012 - July 11, 2014). Not funded.
49. D. H. Matthiesen (PI), I. Alexander, R. H. French, X. Zeng, "Project Icebreaker," Sponsored by LEEDCo, Inc., \$2,087,999.00. (October 1, 2012 - October 1, 2017). Not funded.
48. R. H. French(PI), Zhao, H., "HIKARI - Innovative Insolation Displacement," Sponsored by eQED, \$74,739.00. (January 1, 2013 - January 1, 2015). Not funded.
47. R. H. French(PI), L. S. Bruckman, G. -Q. Zhang, W. Gambogi, S. Fowler, L. Ji, D. Burns, "Lifetime and Degradation Science of Critical to Lifetime Performance Components of Photovoltaics," Sponsored by Department of Energy-PREDICTS, Federal / National. (2013). Not Funded.
46. L. S. Bruckman, R. H. French, "Lifetime and Degradation Science of Acrylic Hardcoats for Automotive and Window Film Applications," Sponsored by Saint-Gobain Ceramics, \$115,883.00. (September 1, 2013 - August 31, 2014).
45. R. H. French (PI), Lifetime and Degradation Science of Nylon for Outdoor Cable Ties, National Electrical Manufacturers Association, Start: 09/27/2013; End: 11/01/2013, Not funded.
44. T. Peshek, R. H. French, "HelioVolt Na Migration Study," Sponsored by HelioVolt, Inc, Industry, \$151,297.00. (November 1, 2013 - December 1, 2014). Not funded.
43. R. H. French(PI), Zhao, H., Peshek, T., "Scientifically Informed Testing Methodologies for Improved Lifetime Performance for Photovoltaic Module Level Power Electronics," Sponsored by DOC-National Institute of Standards & Technology, \$438,708.00. (January 1, 2014 - January 1, 2016). Not funded.
42. R. H. French(PI), Bruckman, L., Zhang, G.-Q., Singer, K., Sun, J., "ERC for the System for Lifetime and Durability (SoLiD)," Sponsored by NSF, (2014). Not Funded.
41. R. H. French (PI), J. L. W. Carter, J. Sun, H. Zhao, R. F. Savinell, G. -Q. Zhang, E. Pentzer, K. Singer, R. Podgornik, "Control of Degradation Pathways in Interface-Rich Energy Materials," Sponsored by Department of Energy: EFRC, Federal / National, \$19,698,804.00. (Submitted July 2014) Not funded.
40. R. H. French(PI), H. Zhao, T. Peshek, "Scientifically Informed Testing Methodologies for Improved Lifetime Performance for Photovoltaic Module Level Power Electronics," Sponsored by DOC-National Institute of Standards & Technology, \$438,708.00. (January 1, 2014 - January 1, 2016). Not funded.
39. R. H. French(PI), H. Zhao (Co-PI), "Rambus LED Light Guide Durability Testing: Real Time and Accelerated," Sponsored by Rambus, Industry, \$400,000.00. 2014, Not Funded.
38. H. Zhao (PI), R. H. French, "Novel Microstructure Designs for Light-Emitting Diodes based Lighting Technology," Sponsored by Rambus, Industry, \$90,000.00. 2014, Not funded.
37. T. Peshek (PI), R. H. French, "Further development of energyCRADLE and data ingestion and data access from UL SunFarm sites in Taiwan and India," Sponsored by Underwriter's Laboratories, LLC, Industry, \$40,643.00. (October 1, 2014). Not funded.

36. A. H. Heuer (PI), R. H. French, "Exploring the Atomic and Electronic Structure of Materials to Predict Functional Material Properties," Sponsored by University of Pittsburgh, \$2,035,654.00. (July 1, 2014 - July 1, 2021). Not funded.
35. French, R. H., "Energy Frontier Research Center: Control of Degradation Pathways in Interface-Rich Energy Materials (EFRC: CDP-IREM)," Sponsored by Department of Energy, \$19,682,196.00. (September 1, 2014 - September 1, 2019). Not funded.
34. R. H. French, J. L. W. Carter, T. Peshek, "Lifetime and Degradation Science of Nylon and Polyester Web Slings and Coupons," Sponsored by Web Sling and Tie Down Association, Industry, \$269,000.00. (November 1, 2014 - October 31, 2016). Not funded.
33. T. Peshek (PI), J. L. W. Carter, R. H. French, "NEMA Nylon Cable Ties," Sponsored by NEMA, Other, \$269,000.00. (November 1, 2014 - October 31, 2016). Not funded.
32. R. H. French(Co-PI), Zhao, H. (PI), Peshek, T., Sponsored by Samsung, CWRU, \$96,658.00. (December 1, 2014 - November 30, 2015). Not Funded.
31. H. Zhao (PI), R. H. French, T. Peshek, Sponsored by Samsung, CWRU, \$96,658.00. (December 1, 2014 - November 30, 2015). Not funded.
30. R. H. French (PI), "Materials-CRADLE: A Data Science and Analytics Machine for Materials Development," Sponsored by Defense Advanced Research Project Agency, \$2,478,890.00. (January 1, 2015 - January 1, 2018). Not Funded
29. R. H. French(PI), L. S. Bruckman, "Backsheets - Correlation of Long-Term Field Reliability with," Sponsored by Underwriters Laboratories, Inc., \$399,999.00. (October 1, 2015 - October 1, 2019). Not funded.
28. R. H. French (PI), "Characterization network to determine crack formation and propagation in c-Si solar panels," Sponsored by Brookhaven National Laboratory, \$688,000.00. (October 1, 2015 - October 1, 2018). Not Funded.
27. Roger H. French (PI). "Multiscale Design of Poly-Responsive ANISOTropic COLLOidal Materials (ANISO-COLL)", \$8,826,307 for 4 yrs." DOE-BES-Computational Materials Science, (Submission: April 25, 2016, Not Funded).
26. G. Palasantzas (PI), R. H. French, A. Lambrecht, "COST Casimir Network," Sponsored by Groningen Univ submission to EU Framework 7 collaboration program, Foreign. (Submitted: June 2016) Not funded.
25. G. Palasantzas (PI), R. H. French, A. Lambrecht, "COST Casimir Network," Sponsored by Universite Pierre et Marie Curie Submission to EU Framework 7 collaboration program, Foreign. (Submitted: June 2016) Not funded.
24. Roger H. French (PI), Laura S. Bruckman (co-PI), J Jaubert (Canadian Solar), M Kempe (NREL), B Gambogi (DuPont), J Peltola, BAPVC DURAMAT, "New high-impact concepts in solar PV module packaging." \$340,000 over 2 years, Submitted February 2017.
23. Roger H. French (PI), Laura S. Bruckman (co-PI), M Hong, J Brynjardottir, M Koyuturk, N Engerer, M Boyd, P Gregoire, D Meakin, DOE-SunShot, Solar Forecasting II, "Data-driven Solar Forecasting: Utilizing Ensemble Stacking of Physical, Statistical and Numerical Models for Validated Irradiance Forecasts." \$1.86 M over 3 years, Submitted March 2017.
22. P. Leu (PI), R. H. French, "Performance and Reliability of Thin Black," Sponsored by University of Pittsburgh, \$26,341.00. (July 1, 2016 - July 1, 2017). Not funded.
21. Laura S. Bruckman (PI), Roger H. French (co-PI), Cybrid Technologies Americas, "Next Generation Backsheet Development." \$480,000 over 3 years, 2017.
20. Roger H. French (PI), Laura S. Bruckman (co-PI), Mingguo Hong, James Bader, Timothy Krueger, Ina Martin, Emily Pentzer, Mark DeGuire, Alexis Abramson, David Matthiesen, Jennifer Carter, Mehmet Koyuturk, National Science Foundation, "REU Site: Data Energy Science." \$382,133 over 3 years, Submitted 2017.

19. Laura S. Bruckman (PI), Roger H. French (co-PI), Lubrizol Innovation Fund, “Data Science Approach to Study Material’s Performance Over a Lifetime: TPU.” \$50,000 over 6 months, 2018.
18. Paul Leu (PI), Co-PI: Laura S. Bruckman, Roger H. French, NSF LEAP HI, “Statistical Optimization Learning Accelerated Research (SOLAR) Framework for Design, Manufacturing, Integration, and Characterization of Next-Generation Photovoltaics.” \$400,000 over 5 years, 2018.
17. Roger H. French (PI), Co-PI: Laura S. Bruckman, Jennifer W. L. Carter, Nikhilesh Chawla, Y. Lin, Nick Bosco (NREL), Department of Energy: PVRD2, “Mechanics of Next Generation Interconnects: Stress, Crack Dynamics and Reliability,” \$1,875,000, PI: , 2018.
16. Kaitlyn E. Crawford (PI, UCF), Co-PI: Kristopher O. Davis (UCF), Roger H. French, Laura S. Bruckman (PI-CWRU), Ina Martin (CWRU), Derk Batzner (Meyer Burger), and Scott Wilcox (SolarTech), Department of Energy: PVRD2, “Silver-free Multi-Wire Metallization of Solar Cells using Transparent Conductive Polymer Films and Copper Grids.” \$2,122,521 for 3 years, 2018.
15. Roger H. French (PI), Co-PI: Laura S. Bruckman, M. Koyuturk, J. Braid, K. Davis (UCF), D. Ushizima (LLNL), A. Jain, M. Köntges, R. Andrews, D. Thevenard, G. Horner, Department of Energy: PVRD2, “Machine Learning for Advanced PV Module Characterization.” \$1,875,000 over 3 years, 2018.
14. Roger H. French (PI), Co-PI: Laura S. Bruckman, Marija Prica, Mehmet Koyuturk, JL Braid, Qiang Fu (EATON), Matthew Reno (Sandia), Todd Gadowski (MCCo), Katie Hoepfl (TerraForm Power), Brian P. Dougherty (NIST), Philip Dean (FirstEnergy), Nick Engerer (Solcast), Department of Energy: PVRD2, “Advanced Data Analytics to Increase Reliability and Security of Power Systems with High PV Penetration.” \$3,415,265 over 3 years, , 2018.
13. York Smith (PI, U of Utah), Co-PI: Raj K. Rajamani (U of Utah), Krista Carlson (U of Utah), Roger H. French (CWRU), Laura S. Bruckman (CWRU), Qingqing Huang (West Virginia University), Manoranjan Misra (University of Nevada), Barbara Reck (Yale University), Prabhat Tripathy (Idaho National Laboratory), Department of Energy: SETO, “Processing Strategies for the Recycling of End of Life PV Module Materials.” \$4,410,000, 2019.
12. Roger French (PI), Co-PI: Joao Maia, Michael-Jon Hore, Laura S. Bruckman, Mehmet Koyuturk, Department of Energy: Basic Energy Sciences, “Spatio-Temporal Evolution of Polymer-grafted Nonoparticle Materials.” \$1,369,274, May 2019.
11. Laura S. Bruckman (PI), Co-PI: Ina Martin (CWRU), Roger French (CWRU), Kris Davis (UCF), Mariana Bertoni (ASU), David Young (NREL), Sumit Agarwal (Colorado School of Mines), Duncan Harwood (D2Solar), DOE SETO: Topic I, “Identifying Durability Risks in Carrier-Selective Heterostructures to Inform the Evolving Silicon Technology Pathway.” 2.4M over 4 years, , 2020.
10. Vyacheslav Romanov (PI, NETL), co-PIs: Roger French, Laura S. Bruckman, DOE-BES-ASCR (Advanced Scientific Computing Res.), “FAIR Frameworks for Relating Multiscale Data and Models for High Performance Computing Simulations to Accelerate Carbon Capture Research.” \$600,000 for 3 years. May 2020.
9. Roger French (PI), co-PIs: Carlos Crespo, Mehmet Koyuturk, Shane Parker, Lydia Kisley, Valentin Rodionov, Laura S. Bruckman MURI ONR Topic 10, “Decomposition of Complex Macromolecular Architectures Under External Stressors: Computation, Spectroscopy, and Graph-Neural-Network Learning.” \$7,500,000 for 5 years. Submitted May 2020.
8. Roger French (PI), co-PIs: Laura S. Bruckman, Lawrence Livermore National Labs: Materials Science, “Materials Data Science: Study Protocols and Materials Aging Hadoop Database.” \$811,434 for 3 years. June 2020.
7. Laura S. Bruckman (PI), Co-PI: Roger H. French, Sherwin Williams, “Ultradurable Data Science.” \$148,644 for 1 year, 2020. (Put on hold due to COVID-19)
6. Vyacheslav Romanov (PI, NETL); Co-PI: Laura S. Bruckman, Roger H. French, ARPA-E Open, “AI Tool for High-Temperature Alloy Design.” Proposed Funds: Fed: \$2,250,000/ Cost Share: \$112,500/ Total: \$2,362,500 for 3 Years. Submitted July 2021.

5. Richard L. Jameson (PI, Trane); Laura S. Bruckman (CWRU PI), Roger H. French, John J. Lewandowski, ARPA-E Open 2021, “Lifetime Prediction of Composite Materials for Heavy Truck Applications: Reduce Energy Consumption through Weight Reduction.” \$2,918,250 for 36 Months, 2021.
4. L. S. Bruckman (PI), Roger H. French, John J. Lewandowski, “Composites Conundrum”, **Trane Technologies**, \$555,000 for 3 years, 2021.
3. R. H. French (PI, CWRU subaward), D. Gordon (PI, Edifice Analytics Inc, Prime), “A Comprehensive Site-Energy Monitoring, Management & Efficiency System for the Future US Energy Landscape”, **US DOE ARPA-E ScaleUp 2021**, DE-FOA-0002459, Total Award \$8,000,000, 36 months, CWRU subaward, \$2,000,000, 1/20/2022.
2. R. H. French (PI, CWRU subaward), Co-PI: Yinghui Wu, Matt Willard, Prime: Don Brown, John Carpenter, Los Alamos National Laboratory, other Co-PIs: Simergeet Gill, Brookhaven National Laboratory, Jonathon Almer, Argonne National Laboratory, DOE-NNSA NA. “Shining a Bright Light on Manufacturing Fingerprints”, CWRU subaward \$495,000 for 3 years, 2022.
1. R. H. French (PI, CWRU subaward), Prime: Leo Fifield, Donghui Li, Pacific Northwest National Laboratory, other Co-PIs: Gabe Smith, Jennifer Harper, Energy Northwest, Michael Dunnigan, Tucci Energy Services, **Department of Energy, SETO: SIPS**, “Correlation of Performance of Artificially and Field-aged Photovoltaics Using a Data-driven Machine Learning Approach”, CWRU subaward \$144,129 for 1 year, 2022.

10.1.4 Service Agreements with Industry

6. HIKARI –Innovative Insolation Displacement, eQED, (Start: 07/11/2011; End: 07/11/2014). \$0.00
5. GreenField Solar Inc. - Real time and accelerated, Greenfield Solar Inc., (Start: 04/06/2012; End: 01/01/2014)’ \$0.00
4. Q-Lab – Master Service Agreement, Q-Lab Corporation, (Start: 06/26/2012; End: 06/25/2014). \$0.00
3. Rambus - SOW 1, Rambus Delaware LLC, (Start: 10/25/2012; End: 10/24/2013). \$0.00.
2. Hercules/Ashland Service Agreement, Hercules, Inc., (Start: 03/05/2013; End: 03/04/2014). \$0.00
1. R. H. French(PI), ”Replex Plastics - LC2PV Low-cost low-concentration photovoltaics,” Sponsored by Replex Plastics, (Start: 03/05/2013; End: 03/04/2014, \$2.00.

10.1.5 Training Awards

3. G.-Q. Zhang (PI), R. H. French (Co-PI), Carter, J. (Supporting), Abramson, A. R. (Co-PI), Wnek, G. E. (Co-PI), Boyatzis, R. (Co-PI), Lewicki, M. S. (Supporting), Sun, J. (Supporting), ”NRT-DESE: Temporal Analytics in an Open Data Sandbox,” Sponsored by NSF-National Science Foundation, Federal / National, \$2,999,932, August 1, 2015 - 2020. Not funded.
2. R. H. French(PI), Peshek, T., Matthiesen, D. H., Manas-Zloczower, I., Gao, R., Koyuturk, M., ”NRT-DESE: A Lifetime and Degradation Collaboratory on Complex Material Systems,” Sponsored by National Science Foundation, Federal / National Research Traineeship, Data Enabled Science & Engineering, \$2,987,971.00. (August 1, 2016 - July 30, 2021). Not Funded.
1. Roger H. French (PI), J. L. W. Carter, M. De Guire, J. Maia, M. Hore, M. Koyuturk, J. Brynsjarsdottir, R. Boyartis, M. Fulz, R. Brent, “Collaboratory on Materials Data Science for Energy Systems”, Sponsored by National Science Foundation, National Research Traineeship, Harnessing the Data Revolution, \$3,000,000. (Start: 9/1/2018, End: 8/31/2023). Not Funded.

10.1.6 Service Awards

13. R. H. French(PI), "DuPont - SOW1 - Weatherability Test Methodology for PV Backsheet," Sponsored by Dupont Company, \$4.00.
12. R. H. French(PI), "GreenField Solar Inc. - Real time and accelerated reliability testing of CPV modules and solar cells," Sponsored by Greenfield Solar Inc., \$2.00.
11. R. H. French(PI), "Q-Lab - Master Service Agreement," Sponsored by Q-Lab Corporation, \$2.00.
10. R. H. French(PI), Rambus - SOW 1," Sponsored by Rambus Delaware LLC, \$49,999.00.
9. R. H. French(PI), "Replex Plastics - Concentrated Daylighting," Sponsored by Replex Plastics, \$2.00.
8. R. H. French(PI), "Q-Lab - Master Service Agreement," Sponsored by Q-Lab Corporation, \$0.00. (June 26, 2012 - June 25, 2014).
7. R. H. French(PI), "Hercules/Ashland Service Agreement," Sponsored by Hercules, Inc., \$1.00. (June 1, 2013 - June 1, 2014).
6. R. H. French(PI), "GreenField Solar Inc. - Real time and accelerated reliability testing of CPV modules and solar cells," Sponsored by Greenfield Solar Inc., \$0.00. (April 6, 2012 - January 1, 2014).
5. R. H. French(PI), "Rambus - SOW 1," Sponsored by Rambus Delaware LLC, \$50,000.00. (October 25, 2012 - October 24, 2013).
4. R. H. French(PI), "eQED - A study of the reliability and performance of inverters and like power devices," Sponsored by eQED, \$2.00. (July 11, 2012 - July 11, 2013).
3. R. H. French(PI), "Q-Lab - Master Service Agreement," Sponsored by Q-Lab Corporation, \$0.00. (June 26, 2012 - June 25, 2013).
2. "Rochester Institute of Technology (RIT) Service Agreement," Sponsored by Rochester Institute of Technology, \$1.00. (August 18, 2014 - August 18, 2015).
1. French, R., "PPG Service Agreement," Sponsored by PPG Industries Inc., \$1.00. (June 23, 2014 - June 23, 2015).

10.1.7 Research Awards, Prior to coming to CWRU

Prior to CWRU; funded and completed: The majority of my work at DuPont was internally funded by DuPont, and not enumerated here.

9. 2003: R. H. French, "Lifetime Extension and Degradation Mechanisms Investigation of DuPont 157 nm Soft Pellicle Fluoropolymers", Proposal to **SEMATECH** under the 157 nm Lithography Program for 12 month funding. Project LITJ213 granted April 2003 with 3 scientists, 3 technicians.
8. 2001: R. M. Cannon, W. C. Carter, Y. M. Chiang, W. Y. Ching, D. Cockayne, R. H. French, S. H. Garafolini, M. Gautier, M. Hoffman, M. Ruhle, A. P. Sutton, "Nanometer-Scale Induced Structure between Dissimilar Materials" (NanoAM), proposal to the **National Science Foundation** under the **EU/NSF Cooperative Research in Materials Science**, Granted July 2001 for 3 year, \$2.1 million NSF funding to Massachusetts Institute of Technology with \$256,827 subcontract to University of Pennsylvania. NSF Award Number DMR-0010062, **EU Commission** Contract No: G5RD-CT-2001-00586
7. 2001: R. H. French, "157 nm Pellicle Development", Proposal to **SEMATECH** under the 157 nm Lithography Program for 18 month funding. Project LITJ213 granted January 2000, with 2 scientists and 4 technicians. Program Expanded January 2001 for additional year, with 4 scientists, 5 technicians, 2 engineers.
6. 1998: R. H. French, P. F. Carcia, "Phase Shifting Mask Photo-Blank with Attenuating Film Absorber for 248 nm and 193 nm Lithography", proposal to **SEMATECH** under the 193 nm Lithography Program for 2 year funding. Project LITG361 granted January 1998 with 5 scientists and 3 technicians.

5. 1996: D. A. Bonnell, R. H. French, "Local Bonding and Properties of Cr- Oxycarbonitrides using Scanning Tunneling, Electron Energy Loss, and Optical Spectroscopies", proposal to **National Science Foundation** under the **GOALI** program, for 3 year funding at Univ. of Pennsylvania. Granted July 1996, \$650 thousand program including \$290 thousand DuPont Contribution. NSF Award number DMR-9531743.
4. 1995: R. H. French, "DUV & 193 nm Attenuated Materials Screening", proposal to **SEMATECH** under the Critical Materials Program for 1 year funding. Project CMTA001 granted September 1995, with 5 scientists and 3 technicians. Program coordinated with Rochester Institute of Technology.
3. 1994: F. D. Kalk, R. H. French, "Embedded Shifter Attenuated Photomask Blanks Development", proposal to **SEMATECH** under the Phase Shift Mask Program for 1 year funding. Project J79 granted February 1994, with 4 scientists, 4 technicians.
2. 1987: R. L. Coble, R. H. French, H. P. Jenssen, "Temperature Dependent Vacuum Ultraviolet Spectroscopy: Impurity Absorption in Ti:Al₂O₃ Laser Crystals and High Temperature", Proposal to **E. I. DuPont de Nemours and Co. Inc.** for work at M. I. T., funding received for 1987.
1. 1986: R. L. Coble, R. H. French, "High Temperature Optical Properties and Electronic Structure of Ceramics", Proposal to **E. I. DuPont de Nemours and Co. Inc.** for work at M. I. T., one year funding received 1986.

10.2 Contracts, Grants and Sponsored Research

Research Awards

STUDENT ADVISING

11.1 Teaching

11.1.1 Case Western Reserve University

13. **DSCI 353-353M-453 – Data Science Modeling, Prediction and Inference: for Energy & Manufacturing**, Undergraduate and Graduate level course, **Data Science**, level 3 course in **Undergraduate Applied Data Science Minor** Spring 2018, Spring 2019. Spring 2020, Spring 2021, Spring 2022, Spring 2023, Spring 2024.
12. **DSCI 351-351M-451 – Exploratory Data Science**, Undergraduate and Graduate level course, **Data Science**, level 3 course in **Undergraduate Applied Data Science Minor** Fall 2018, Fall 2019, Fall 2020, Fall 2021, Fall 2022. Fall 2023.
11. **EMSE 325 – Undergraduate Research in Materials Science and Engineering**, Undergraduate level course, **Materials Science**, Spring 2015, Fall 2015, Spring 2016, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018, Spring 2019, Fall 2019, Spring 2020, Fall 2020, Spring 2021, Fall 2022, Spring 2022, Fall 2023, Spring 2023.
10. **DSCI 352-352M-452 – Undergraduate Applied Data Science Research**, Undergraduate level course, **Data Science**, level 3 course in **Undergraduate Applied Data Science Minor** Spring 2018, Fall 2018, Spring 2019.
9. **DSCI 353-453 – Data Science Modeling, Prediction and Inference: for Energy & Manufacturing**, Undergraduate and Graduate level course, **Data Science**, level 3 course in **Undergraduate Applied Data Science Minor** Spring 2016, Spring 2017.
8. **DSCI 352-452 – Undergraduate Applied Data Science Research**, Undergraduate level course, **Data Science**, level 3 course in **Undergraduate Applied Data Science Minor** Fall 2015, Spring 2016, Fall 2016, Spring 2017, Fall 2017.

7. **DSCI 351-451 – Exploratory Data Science**, Undergraduate and Graduate level course, **Data Science**, level 3 course in **Undergraduate Applied Data Science Minor** Fall 2016, Fall 2017.
6. **EMSE 343-443 – Materials for Electronics and Photonics**, **Materials Science**, Undergraduate and Graduate level course, Fall 2014, Fall 2015.
5. **DSCI 351-451 – Exploratory Data Analysis for Energy and Manufacturing**, Undergraduate and Graduate level course, **Data Science**, level 3 course in **Undergraduate Applied Data Science Minor** Spring 2015.
4. **EMSE 406 – Optical Materials, Elements and Technologies: Photolithography and Photo-voltaics**, Graduate level course with lecture and 2 computational optics laboratories. **Materials Science**, Spring 2011, Spring 2012, Spring 2014.
3. **EMSE 203 – Applied Thermodynamics**, Junior level course, **Materials Science**, Fall 2011, Fall 2012, Fall 2013.
2. **EMSE 453 – R Analytics for Lifetime and Degradation**, Undergraduate and Graduate level course, **Materials Science**, Spring 2013.
1. **EMSE425 – Biomolecular Materials Science**, Graduate level course, **Materials Science**, Fall 2012.

11.1.2 Tohoku University, Sendai Japan

1. **Information Technology Fundamentals: Applied Data Science** Graduate level course, in Graduate School of Information Science, Tohoku University, Sendai Japan, May 29th, 2019 - July 26th 2019.

11.1.3 University of Pennsylvania

6. **EMTM 667 – Executive Master’s in Technology Management - Nanotechnology**: lecture on ”Successful Technology Development: A Case Study of Attenuated Phase Shift Mask Research, Development, and Commercialization”. **Penn Engineering and the Wharton School**(Prof. D. A. Bonnell), April 2008, April 2009, March, 2010.
5. **MSE 495/496 – Senior Design**: two lectures on ”Successful Technology Development: A Case Study of Attenuated Phase Shift Mask Research, Development, and Commercialization”. Senior Design project judging panel member. (Prof. William Graham), Fall 2007, Fall/Spring 2009.
4. **MSE 465/565 - Fabrication and Characterization of Micro and Nanostructured Materials**: three week class segment on ”Semiconductor Micro/Nanofabrication Materials For Moore’s Law”, including two week lab class using Prolith computational optics software for lab class in lithographic printing. (Prof. D. A. Bonnell), November 2004, November 2005, March 2007, March 2008, October 2008.
3. **MSE 330 – Soft Materials**: lecture on ”Soft Materials In Semiconductor Photolithography” (Prof. S. Yang), December 2004.
2. **EAS 210 – Introduction to Nanotechnology**: lecture on ”Materials For Moore’s Law: Nanostructures Galore”, (Prof. K. I. Winey), February 2004.
1. **MSE 790 – Special Topics**: ”Materials For Moore’s Law”, Department of Materials Science, January 2002.

11.1.4 Other Teaching

6. **MSE 590 – Characterization of Mineral and Materials by Spectroscopic Techniques**: lecture on ”Optical Properties and Electronic Structure of Bulk and Interfacial Ceramics From VUV and VEELS Spectroscopy”, **University of Washington**, Materials Science Department, November 2001.
5. Graduate course on **Introduction to Ceramics**: two seminars on ”Optical Properties and Electronic Structure of Ceramics”. **University of Pennsylvania**, November 1988.

4. "Materials for Moore's Law", **DuPont's Chesapeake Farms Conference on Nanotechnology**, August 2001.
3. Course on **Frontiers of Materials Science**: two seminars on "Electronic Structure and Optical Properties of Ceramics: Interatomic Bonding of AlN and α -Al₂O₃" and "Design of Cr-OCN Compounds for Phase Shift Lithography", **University of New Mexico and Sandia Advanced Materials Lab**, September 1994.
2. "Solid State Physics, Materials Science and Ceramics", **Wilmington Christian High School**, Science Alliance Summer Fellowship Program, October 1990, October 1991, October 1992.
1. Graduate course on **Poly-Phase Ceramics**: two seminars on "Optical Properties and Electronic Structure of Ceramics". **Massachusetts Institute of Technology**, March 1989.

11.2 Advising

11.2.1 Undergraduate Research Advising

AY24

139. Minh Luu, "Geospatial"
138. Akissi Ange Dominique Yao, "Multiscale PV "
137. Gabriel Ponon, "XRD Analysis Pipelines "
136. Lam Nguyen, "Geospatiotemporal"
135. Ethan Fang, "Graph Alerting Cyber Security "
134. Vibha Mandayam, "Geospatiotemporal "

AY23

133. Minh Luu, "Geospatial"
132. Akissi Ange Dominique Yao, "Towards 50 PV "
131. Gabriel Ponon, "XRD Analysis Pipelines "
130. Ammar Sulemanjee, "PV st-GNNN"
129. Lam Nguyen, "Geospatiotemporal"
128. Zhuldyz Ualikhankyzy, "XRD and Crystal Growth "
127. Ethan Fang, "XRD Pipelines "
126. Vibha Mandayam, "Geospatiotemporal "

AY22

125. Abhinav Khanna, "EDIFES Virtual Energy Audits, Dashboard"
124. Andre Yost, "netSEM code review and principle 2"
123. Beck Pierce, "JSON-ld for FAIRification"
122. Hein Htet Aung, "Degradation of Acrylics"
121. Hieu Tran, "CRADLEtools 3"
120. Jakob Wegmueller, "netSEM, code streamlining and unit testing"

- 119. Kris Zhao, “Fast Image Segmentation using YOLO”
- 118. Leean Jo, “Stepwise Evaluations of Minimodules”
- 117. Lena Plover, “Stepwise Spire I-V Evaluations”
- 116. Max Atkinson, “Stepwise Evaluations of PV Minimodules”
- 115. Minh Luu, “PV I-V correlation with EL images”
- 114. Nguyen Luu, “Json Editor and Rstudio Apps”
- 113. Ray Le, “BuildingSync API Schema”
- 112. Sakin Kirti, “CRADLE/Spark for data cleaning using SparklyR”
- 111. Shuyue Bian, “Towards 50 Minimodule Evaluations & FAIRification”
- 110. Takoda Denhof, “Fast Image Segmentation using YOLO”
- 109. Thomas Varley, “Fast Image Segmentation using YOLO”
- 108. Tyler Burleyson, “R package development and publication”
- 107. Yijia (Summer) Sun, “Optical Spectroscopy and Electrical Measurements”

AY21

- 106. Jakob Wegmueller, “netSEM Modeling”
- 105. Alejandra Ramos, “I-V Analysis”
- 104. Asher Baer, “Timeseries PV Plant Ingestion”
- 103. Ben Pierce, “Al/Ni Crystallization Machine Learning”
- 102. Carolina Whitaker, “I-V measurements and PV Cell Cracking”
- 101. Deepa Bhuvanagiri, “PV power plant analytics”
- 100. Hein Aung, “Minimodule Characterization”
- 99. Megan Morbitzer, “DDIV & netSEM R Package Development”
- 98. Tyler Burleyson, “PVplr and Suns-Voc R Package Development”
- 97. Minh Luu, “SunFarm Weather & Sensor Ingestion”

AY20

- 96. Alejandra Ramos, “I-V measurement and analysis”
- 95. Ben Pierce, “El Image Machine Learning”
- 94. Asher Baer, “PV Cells and Minimodule Lamination”
- 93. Jakob Wegmueller, “PV Minimodule Lamination”
- 92. James Covello, “Module Lamination”
- 91. William Clarizio, “Module Degradation”
- 90. Carolina Whitaker, “PV Cell Cracking Image Analysis”
- 89. Deepa Bhuvanagiri, “PV power plant analytics”

- 88. Hein Aung, “Minimodule Characterization”
- 87. Megan Morbitzer, “DDIV & netSEM R Package Development”
- 86. Tyler Burleyson, “PVplr and Suns-Voc R Package Development”
- 85. Minh Luu, “I-V Curve Quality Detection”

AY19

- 84. Will Clarizio, “c-Si PERC PV Cell Degradation”
- 83. Ben Pierce “Ni/Al Crystallization”
- 82. Shiyi Qin, “Electroluminescence Image Analysis”
- 81. Ben Pierce, “Image Machine Learning”
- 80. Jakob Wegmueller, “PV Minimodule Fabrication”
- 79. Ziyang Zhang, “Photovoltaic Characterization”

AY18

- 78. Paul MacKenzie, “Analysis of 8 PV Systems Using the rdtools Python Package”
- 77. Will Clarizio, “c-Si PERC PV Cell Degradation”
- 76. Lucas Fridman, Rear-side Irradiance of PV module backsheets.
- 75. Ben Pierce, “Quantitative Image Analysis of Ni/Al Crystallization”

AY17

- 74. Mimi Kang, “PV EVA Lum Image Proc.”
- 73. Emily Nishiwaki, “PV Module Degradation”
- 72. Justin Fada, “Image Processing”
- 71. Shreyas Kamath, “Building Energy Efficiency”
- 70. Geoffrey Svensson, “QSun Thermal Uniformity”
- 69. Justin Fada, “EL Image Analysis”
- 68. Will Koehrsen, “Building Energy Analysis”
- 67. Trey Wager, “c-Si PV Cell Carrier Dynamics”

AY16

- 66. Hiorimi Kang, ”EVA Degradation by Facial Recognition”
- 65. Corey Meyer, ”PET Scattering and Degradation”
- 64. Medha Narwankar, BME, ”Static Light Scattering of Quadruplex DNA”
- 63. Sari Kayyali, ”Spectroscopy of PET Degradation”
- 62. Yiyang Sheng, ”Image Analytics of PV SkyCameras for Partial Cloudiness”
- 61. Taylor Nguyen, EMSE, “Static Light Scattering of DNA”
- 60. Nikhil Goel, “I-V Characterization of PV Degradation”

59. Corey Wells, "Optical Scattering in PET"
58. Yiyang Sheng, "Image Processing of SkyCamera Clouds"
57. Mimi Kang, "Image Recognition in EVA Browning"
56. Christian Matix, "MLEET Timeseries Analysis"
55. Lee Penzarella, "PV Timeseries Analysis"
54. Emily Nishiwaki, "PV Module Degradation"
53. Justin Fada, "Image Processing"
52. Kyle Johnson, "Spectroscopy of Degradation"

AY15

51. Nikhil Goel, "I-V Analysis of PV Modules"
50. Davis Zabiya, "EL Analysis of PV Module Degradation"
49. Cara Fagerholm, "PET Degradation"
48. Spring, Taylor Nguyen, EMSE, "Static Light Scattering of DNA"
47. Matt Randall, "Real-World Performance of PV Power Plants"

AY14

46. Cara Fagerholm, EMAE, "PET Degradation"
45. Spring, Jenna Mancuso, EMSE, "Spectroscopy"
44. Fall, EBME, Katherine Krawiec, "Quadruplex DNA"
43. Spring, Neil He, EMSE, "Spectroscopy"
42. Spring, EBME Jacob Schimelman, "Quadruplex DNA"
41. Spring, Matt Randal, "Real-world PV Power"
40. Diana Acosta, EBME, "Static Light Scattering of BSA"
39. Kelly Peterson, Chemistry, Degradation of Organic Light Emitting Diodes"

AY13

38. Anish Dhar, EECS, "Gecko Hamaker Project"
37. Bhavana Swaminathan, "Real-world PV Power"
36. Matt Randal, "Real-world PV Power"
35. Joe DeGenova, "PV Wires and Connectors"
34. Justin Fada, EMAE, "Electroluminescence"
33. Elan Weiss, EMSE, UG Research, "REDCap R Integration"
32. Diana Acosta, BME, UG Research, "Static Light Scattering of Biomolecular Materials"
31. Jacob Schimelman, BME, UG Research, "Electronic Structure of DNA Oligonucleotides"
30. Joe DeGenova, EMSE, UG Research, "Degradation of PV Module Backsheets"

29. Robert Kidwell, EMSE, UG Research, "Haze and Yellowing in Acrylic"
28. Elan Weiss, "R Analytics"
27. Olga Eliseeva, UG Research, "Degradation of PV Wires and Connectors under Real World and Accelerated Conditions"
26. Kelly Peterson, UG Research, "Transparent Conductive Oxide Degradation"
25. Shay Mathews, Physics Senior Project, "Photovoltaic Degradation Analysis and Two Diode Simulated Models"
24. Veronica Wazney, EMSE Senior Project, "Degradation of Fluoropolymer PV Frontsheets"
23. Luke Revitsky, EMSE Senior Project, "PV Frontside Silver Corrosion in Minimodules Under Damp Heat"
22. Nathan Marques-Handley, EMSE Senior Project, "QUV Degradation of PV Frontside Silver on Bare c-Si Cells"
21. Tyler Piedmonte, Mark Finnegan, Donald Johnson and Eric Young, EECS Senior Projects, "Lifetime and Degradation of DC-AC Microinverter based on GaN Power Devices"

AY12

20. Shawn Rupp, EMAC Senior Project, "Degradation of Mirror Augmented PV Minimodules"
19. Alan Filer, EMSE Senior Project, "Soiling of Cool Roofs and the Proposed ASTM Standard"
18. Ian Kidd, EMSE Senior Project, "Spectroscopic Ellipsometry of Biomolecular Materials"
17. Lauren Elkins, EECS Senior Project, "Front-End Data Acquisition and Informatics for SDLE Sun Farm Network"
16. Lijia Lu, EECS Senior Project, "Development of Gecko Hamaker Open Source Software Project: Move to MySQL Webservice Infrastructure"
15. Jacob Gresh, "Confocal Microscopy for Degradation of Mirrors for Photovoltaic Applications".
14. Diana Acosta, BME, UG Research Experience, "Solar Mirror Reflectance Reproducibility"
13. Olga Eliseeva, EMSE, Work Study, "1200X Sun Concentrating PV cell exposures and IV Curve Tracing"
12. Spring, Kelly Peterson, Chem, UG Research Experience, "Contact Angles and Surface Energies of PMMA and ITO with Degradation"
11. Kelly Peterson, UG Research Experience, "Transparent Conductive Oxide Degradation"
10. Olga Eliseeva, UG Research, "Degradation of PV Wires and Connectors under Real World and Accelerated Conditions"
9. Devin Gordon, Clemson University, CLIPS REU Program. "Real Time Degradation Testing of PV Materials In the SDLE SunFarm"
8. Ian Kidd, EMSE, "Spectroscopic Ellipsometry"
7. Elena Stachew, EMAC, "Durability of PV Module Backsheets"
6. Donald Huckle, CCSE, "Data Acquisition and Time Series Analysis for the SDLE SunFarm"
5. Matt DelBrocco, CCSE, "Gecko Hamaker Computational Optics for vdW-Ld Interactions of DNA"

AY11

4. Devin Gordon, Clemson University, CLIPS REU Program. "Optical Properties of Three Grades of PMMA Acrylic"
3. Esther Deena, Work Study, "Optical Spectroscopy of Acrylics for PV"
2. Joe Karas, EMAC Senior Project, "Time Series Analysis of PV Module Power Degradation Rates"
1. Sam Richardson, Physics Senior Project, "Classifying the Degradation of Acrylic Materials by the Bidirectional Scatter Distribution Function"

11.2.2 Undergraduate Major & Applied Data Science (ADS) Minor Advising

AY24

- 236. CSE ADS Minor: Abbey Rzeszutko
- 235. CSE ADS Minor: Ashwin Menon
- 234. CSE ADS Minor: Benjamin Wellnitz
- 233. CSE ADS Minor: Diego Martinez
- 232. CSE ADS Minor: Gabriel Ponon
- 231. CSE ADS Minor: Ian Dyke
- 230. CSE ADS Minor: Shreeya Chugh
- 229. CSE ADS Minor: Vivek Aslot
- 228. CSE ADS Minor: Weston Mansier
- 227. CSE ADS Minor: Yiwen Gao
- 226. CSE ADS Minor: Matthew Hoffman
- 225. CAS ADS Minor: Abigail Wilkov
- 224. CAS ADS Minor: Chelsy Dai
- 223. CAS ADS Minor: Diana Hume-Rivera
- 222. CAS ADS Minor: Joy Fan
- 221. CAS ADS Minor: Kaila Nutter
- 220. CAS ADS Minor: Lilly Cooper
- 219. CAS ADS Minor: Olivia McLaine
- 218. CAS ADS Minor: Ralston Goldfarb
- 217. CAS ADS Minor: Vani Subramony
- 216. CAS ADS Minor: Yinyuan Chen
- 215. MGT ADS Minor: Alejandro Carrillo-Rodriguez
- 214. MGT ADS Minor: Annette Pham
- 213. MGT ADS Minor: Attiksh Panda
- 212. MGT ADS Minor: Chenna Ahaghotu
- 211. MGT ADS Minor: Connor Fang

- 210. MGT ADS Minor: Henry Ogden
- 209. MGT ADS Minor: Holly Khuvizaya
- 208. MGT ADS Minor: James Putnam
- 207. MGT ADS Minor: Kevin Arndt
- 206. MGT ADS Minor: Luciano Duca
- 205. MGT ADS Minor: Nicholas Balogh
- 204. MGT ADS Minor: Pallavi Goculdas

AY23

- 203. CSE ADS Minor: Abbey Rzeszutko
- 202. CSE ADS Minor: Ashwin Menon
- 201. CSE ADS Minor: Diego Martinez
- 200. CSE ADS Minor: Josh Levy
- 199. CSE ADS Minor: Keith Cartwright
- 198. CSE ADS Minor: Kevin Salipante
- 197. CSE ADS Minor: Leean Jo
- 196. CSE ADS Minor: Ram Nallappan
- 195. CSE ADS Minor: Rebecca Kong
- 194. CSE ADS Minor: Rounak Chawla
- 193. CSE ADS Minor: Shivani Tijare
- 192. CSE ADS Minor: Shreeya Chugh
- 191. CSE ADS Minor: Vivek Aslot
- 190. CSE ADS Minor: Weston Mansier
- 189. CSE ADS Minor: Zhuldyz Ualikhankyzy
- 188. CSE ADS Minor: Ergis Mecaj (exm335)
- 187. CSE ADS Minor: Matthew Hoffman (mmh174)
- 186. CSE ADS Minor: Yash Goswami (yxg407)
- 185. CAS ADS Minor: Abigail Wilkov (ajw265)
- 184. CAS ADS Minor: Diana Hume-Rivera (dgh46)
- 183. CAS ADS Minor: Elyse Brozost (emb228)
- 182. CAS ADS Minor: Ilana Levy (izl)
- 181. CAS ADS Minor: Joy Fan (jyf6)
- 180. CAS ADS Minor: Megan Griffith (mmg138)
- 179. CAS ADS Minor: Serene Pierce (sxp871)
- 178. CAS ADS Minor: Summer Sun (yxs944)

177. CAS ADS Minor: Winston Kam (wrk43)
176. MGT ADS Minor: Annabel Wood (aew113)
175. MGT ADS Minor: Attiksh Panda (aap184)
174. MGT ADS Minor: Connor Fang (cjf117)
173. MGT ADS Minor: Eric Chi (yxc1293)
172. MGT ADS Minor: Henry Ogden (hko5)
171. MGT ADS Minor: Holly Khuvizaya (kxk793)
170. MGT ADS Minor: James Putnam (jap246)
169. MGT ADS Minor: Lauren Butia (lcb67)
168. MGT ADS Minor: Mason Jester (mbj26)
167. MGT ADS Minor: Mohana Venkatapuram (mpv25)
166. MGT ADS Minor: Pallavi Goculdas (pkg23)
165. MGT ADS Minor: Robby Johnson (rlj54)
164. MGT ADS Minor: Zachary Gee (zsg7)

AY22

163. CSE ADS Minor: Ergis Mecaj (exm335)
162. CSE ADS Minor: Matthew Hoffman (mmh174)
161. CSE ADS Minor: Zachary Kadish (zbk3)
160. CSE ADS Minor: Kameron MacKenzie (kpm61)
159. CSE ADS Minor: Yageen Hassan (ymh5)
158. CSE ADS Minor: Yash Goswami (yxc407)
157. CSE ADS Minor: Jerry Yang (jxy680)
156. CSE ADS Minor: Jonah Bachman (jab433)
155. CSE ADS Minor: Josh Levy (jml312)
154. CSE ADS Minor: Neil Wible (naw53)
153. CSE ADS Minor: Ram Nallappan (man90),
152. CSE ADS Minor: Shivani Tijare (sat91)
151. CSE ADS Minor: Simrita Jesthi (sxj532)
150. CSE ADS Minor: Vivek Aslot (vra14)
149. CSE ADS Minor: Animesha Krishnamurthy (axk1071)
148. CSE ADS Minor: Hein Htet Aung (hxx483)
147. CSE ADS Minor: Rebecca Kong (hxx545)
146. CSE ADS Minor: Shreeya Chugh (sxc1514)
145. CAS ADS Minor: Gabriella Koh (gbk27)

144. CAS ADS Minor: Keaton Markey (klm193),
143. CAS ADS Minor: Megan Griffith (mmg138)
142. CAS ADS Minor: Michael Zhang (jxz1011)
141. CAS ADS Minor: Preeti Balachandran (ppb17)
140. CAS ADS Minor: Serene Pierce (sxp871)
139. CAS ADS Minor: Ansh Roge (axr734)
138. CAS ADS Minor: Aritra Chakraborty (axc813)
137. CAS ADS Minor: Elyse Brozost (emb228)
136. CAS ADS Minor: Helena Lin (hxl974)
135. CAS ADS Minor: Ilana Levy (izl)
134. CAS ADS Minor: Ishita Kottapalli (ixk144)
133. CAS ADS Minor: Kathryn Liebler (kml109)
132. CAS ADS Minor: Lauren Sharkey (lms243)
131. CAS ADS Minor: Qiuyi Wei (qwx227)
130. CAS ADS Minor: Raphael Aleman (rma102)
129. CAS ADS Minor: Summer Sun (yxs944)
128. CAS ADS Minor: Thomas Koss (trk33)
127. CAS ADS Minor: Jack Zhang (cxz416)
126. MGT ADS Minor: Eric Chi (yxc1293)
125. MGT ADS Minor: Lauren Butia (lcb67)
124. MGT ADS Minor: Mason Jester (mbj26)
123. MGT ADS Minor: Pallavi Goculdas (pkg23)
122. MGT ADS Minor: Mohana Venkatapuram (mpv25)

AY21

121. CSE ADS Minor: Adam Stewart (axs1477)
120. CSE ADS Minor: Austin Keppers (agk51),
119. CSE ADS Minor: Benjamin Pierce (bgp12)
118. CSE ADS Minor: Ergis Mecaj (exm335)
117. CSE ADS Minor: Erik Hynes (eph34)
116. CSE ADS Minor: Grace Kemerer (gmk42)
115. CSE ADS Minor: Jack Zhang (cxz416)
114. CSE ADS Minor: Kameron MacKenzie (kpm61)
113. CSE ADS Minor: Matthew Hoffman (mmh174)
112. CSE ADS Minor: Mitchell Adamczyk (mja115)

111. CSE ADS Minor: Olivia Love (oml11)
110. CSE ADS Minor: Rembrandt van der Ploeg (rev24)
109. CSE ADS Minor: Thomas Patton (tjp94)
108. CSE ADS Minor: Timothy Jin (tcj16)
107. CSE ADS Minor: Yageen Hassan (ymh5)
106. CSE ADS Minor: Yash Goswami (yxg407)
105. CSE ADS Minor: Zachary Kadish (zbk3)
104. CSE ADS Minor: Alec Peltekian (akp96)
103. CSE ADS Minor: Benjamin Pierce (bgp12)
102. CSE ADS Minor: Daniel Schnabel (dls197)
101. CSE ADS Minor: Hein Htet Aung (hxx483)
100. CSE ADS Minor: Hope Yashnik (hry7)
99. CSE ADS Minor: Joseph Recchia (jer161)
98. CSE ADS Minor: Josh Levy (jml312)
97. CSE ADS Minor: Julian Narvaez (jmn112)
96. CSE ADS Minor: Marlee Dingle (med124)
95. CSE ADS Minor: Neil Wible (naw53)
94. CSE ADS Minor: Paul McCabe (pkm29)
93. CSE ADS Minor: Rebecca Kong (hxx545)
92. CSE ADS Minor: Shivani Tijare (sat91)
91. CSE ADS Minor: Simrita Jesthi (sxj532)
90. CSE ADS Minor: Will Oltjen (wco3)
89. CAS ADS Minor: Ansh Roge (axr734)
88. CAS ADS Minor: Christiana Wang (cxw608)
87. CAS ADS Minor: Gabriella Koh (gbk27)
86. CAS ADS Minor: Ha Do (hkd7)
85. CAS ADS Minor: Ilana Levy (izl)
84. CAS ADS Minor: Ishita Kottapalli (ixk144)
83. CAS ADS Minor: Jakob Woerner (jaw281)
82. CAS ADS Minor: Jonathan Powell (jsp125)
81. CAS ADS Minor: Lauren Sharkey (lms243)
80. CAS ADS Minor: Megan Griffith (mmg138)
79. CAS ADS Minor: Megan Morbitzer (mmm308)
78. CAS ADS Minor: Michael Johnson (mbj24)

77. CAS ADS Minor: Qiuyi Wei (qxw227)
76. CAS ADS Minor: Sakin Kirti (sak207)
75. CAS ADS Minor: Serene Pierce (sxp871)
74. CAS ADS Minor: Cat Crespo (cbc59)
73. CAS ADS Minor: Javon Colvin-Hatchett (jtc131)
72. CAS ADS Minor: Paul Jensen (pnj6)
71. MGT ADS Minor: Abby Ramadan (alr138)
70. MGT ADS Minor: Mason Jester (mbj26)
69. MGT ADS Minor: Mohana Venkatapuram (mpv25)
68. MGT ADS Minor: Natalie Walton (naw48)

AY20

67. ADS Minor: (Missing Data)

AY19

66. ADS Minor: (Missing Data)

AY18

65. ADS Minor: (Missing Data)

AY17

64. ADS Minor: (Missing Data)

AY16

63. ADS Minor: Justin Fada
62. ADS Minor: Elizabeth Hodges
61. ADS Minor: Mark Sahlani
60. ADS Minor: Matt Randall
59. ADS Minor: Nikhil Goel
58. ADS Minor: Reena Patel
57. ADS Minor: Maria Kim
56. ADS Minor: Olga Eliseeva
55. ADS Minor: Diana Acosta
54. ADS Minor: Taylor Nguyen
53. ADS Minor: Kelly Peterson
52. ADS Minor: Cara Fagerholm
51. ADS Minor: Davis Zabiya

AY15

50. ADS Minor: Justin Fada,
49. ADS Minor: Elizabeth Hodges
48. ADS Minor: Mark Sahlani
47. ADS Minor: Matt Randall
46. ADS Minor: Nikhil Goel
45. ADS Minor: Reena Patel
44. ADS Minor: Maria Kim
43. ADS Minor: Olga Eliseeva
42. ADS Minor: Diana Acosta
41. ADS Minor: Taylor Nguyen
40. ADS Minor: Kelly Peterson
39. ADS Minor: Cara Fagerholm
38. ADS Minor: Davis Zabiyyaka

AY14

37. UG Research: Jenna Mancuso
36. UG Research: Elan Weiss
35. UG Research: jacob Schimelman
34. UG Research: Diana Acosta
33. UG Research: Kelly Peterson
32. UG Research: Veronica Wazney
31. UG Research: Luke Revitsky
30. UG Research: Nathan Marquez-Hendley
29. UG Research: Shay Mathews
28. UG Research: Neil He
27. UG Research: Cara Fagerholm
26. UG Research: Justin Fada
25. UG Research: Katherine Krawiec
24. UG Research: Bhavana Swaminathan
23. UG Research: Joseph DeGenova
22. UG Research: Matt Randall
21. UG Research: Robert Kidwell

AY13

20. UG Research: Joseph DeGenova

19. UG Research: Shay Mathews
18. UG Research: Robert Kidwell
17. UG Research: Elan Weiss
16. UG Research: Jacob Schimelman
15. UG Research: Diana Acosta
14. UG Research: Kelly Peterson
13. UG Research: Veronica Wazney
12. UG Research: Luke Revitsky
11. UG Research: Nathan Marquez-Hendley

AY12

10. UG Research: Joseph DeGenova
9. UG Research: Shay Mathews
8. UG Research: Robert Kidwell
7. UG Research: Elan Weiss
6. UG Research: Jacob Schimelman
5. UG Research: Diana Acosta
4. UG Research: Kelly Peterson
3. UG Research: Veronica Wazney
2. UG Research: Luke Revitsky
1. UG Research: Nathan Marquez-Hendley

AY11

11.2.3 Graduate Students and Postdoctoral Associates Advised

M. S Thesis Advisor for:

Current

9. Johan Buecher, CWRU EMSE MS Program, Expected May 2027, Advisor Roger French.
8. Rounak Chawla, CWRU CSDS BS/MS Program, “CRADLE Development Environment”, Advisors Roger French, MS degree expected Jan. 2026.
7. Lam Nguyen, CWRU CSDS BS/MS Program, “Large Language Models”, Advisors Rpgger French, Yinghui Wu, MS degree expected. May 2025
6. Vibha Mandayam, CWRU CSDDS BS/MS Program, “Geospatiotemporal Analytics”, Advisors Roger French, Yinghui Wu, Erika Barcelos, MS degree expected May 2026.
5. Gabriel Ponon, CWRU EMSE BS/MS Program, “Scattering Tomography”, Advisors Roger French, MS degree expected Dec. 2025
4. Van Tran, CWRU EMSE MS Program, “Materials Data Science Ontology”, Advisors Roger French, Erika Barcelos, MS degree expected May 2026.

3. Akissi Ange Dominique Ya, “Multiscale Characterization of PV Module Degradation”, Advisors Roger French, Laura Bruckman, MS degree expected January 2025.
2. Sophia Hall, CWRU CSDS BS/MS Program, “Graph Alerting Cyber Security Detector”, Advisors Roger French, Vipin Chaudhary, MS degree expected May 2025.
1. Jonah Bachman, CWRU EMSE MS degree, Advisors Roger French, Matthew Willard, Degree expected January 2026.

**Graduated
2025**

32. Priyan Rajamohan, CWRU CSDS BS/MS Program, “FAIRmaterials with rdflib package”, Advisors Roger French, Erika Barcelos, MS degree, January 2025.
31. Finley Holt, “XRDimage: Automated Synchrotron Beamline XRD analysis”, Advisors Roger French, Matt Willard, MS degree, January 2024.

2024

30. Alexander Harding Bradley, Development of an Automated Framework and Package for Knowledge Unification Across the Materials and Data Science Domains, MS Thesis, CWRU, 2024.
29. S.J. Maurer, Identifying Savings in Residential Electricity Consumption Through Data-Driven Analysis, MS Thesis, Dartmouth, 2024. https://digitalcommons.dartmouth.edu/cgi/viewcontent.cgi?article=1208&context=masters_theses.
28. W.C. Oltjen, CWRU EMSE MS Program, “Identifying Performance Loss Mechanisms in Photovoltaic Timeseries and UV Fluorescence Image Datasets Adhering to FAIR Principles”, Case Western Reserve University, 2024. https://etd.ohiolink.edu/acprod/odb_etd/r/etd/search/10?p10_accession_num=case1693413356&clear=10&session=131144751599643. MS degree conferred January 2024.
27. O.D. Akanbi, CWRU EMSE MS Program, “Leveraging Multimodal Data for Geospatiotemporal Analytics”, Case Western Reserve University, 2024. https://etd.ohiolink.edu/acprod/odb_etd/r/etd/search/10?p10_accession_num=case1699536369560882&clear=10&session=131144751599643 MS degree conferred January 2024.

2023

26. D. Bhuvanagiri, CWRU CSDS MS Program, “Assessment of Degradation across the Shallow Subsurface for the Contiguous United States using Spatiotemporal Modeling”, Case Western Reserve University, 2023. https://etd.ohiolink.edu/acprod/odb_etd/r/etd/search/10?p10_accession_num=case1702460844708852&clear=10&session=131144751599643, Research Co-advisors, Jeffrey Yarus, MS degree conferred January 2024.
25. D.C. Meshnick, CWRU CSDS MS Program, “Multimodal Image Classification In Fluoropolymer AFM And Chest X-Ray Images”, MS Thesis in Computer Science, Case Western Reserve University, 2023. https://etd.ohiolink.edu/acprod/odb_etd/r/1501/10?p10_accession_num=case1674834757745168&clear=10.

2022

24. Stephen Timothy, CWRU EMAE MS Program, “Validation of EDIFES Virtual Building Energy Audits”, Research Co-advisors: Roger French, Alexis Abramson, Academic Advisor Brian Maxwell, MS degree conferred August 2022.
23. Alex West, CWRU EMAE MS Program, “Heating Type and Validation of EDIFES Virtual Building Energy Audits” Research Co-advisors: Roger French, Alexis Abramson, Academic Advisor Clare Rinnac, MS degree conferred January 2022.

22. Raymond Wieser, CWRU EMSE MS Program, “Degradation of Real World Photovoltaic Module Back-sheets”, MS degree conferred May 2022. Research Advisor: Laura S. Bruckman. Academic Advisor: Roger French.
21. Kunal Rath, 2019 to present. Research Co-advisors: Laura S. Bruckman and Roger French. Academic Advisor: Roger French, MS degree conferred January 2022.

2021

20. Sameera Nalin Venkat, CWRU EMSE MS Program, “Network Structural Equation Modeling of PV Mini-module Variants Under Indoor Accelerated Exposures”, co-advised with L. S. Bruckman, degree conferred May 2021.

2020

19. JiQi Liu, CWRU EMSE MS Program, “Degradation & Partial Shading Study of Photovoltaic Modules in the Field: Enabled by Time-series Current-Voltage & Power Analysis” degree conferred August 2020.
18. Arthur X. Shin, “Optimization of the Big Data Photovoltaic Time-series Analysis Process Through Hybrid Distributed Computing”, CWRU CS MS Program, degree conferred August 2020.
17. Suk Hyun Hwang, “Optimization of the Big Data Photovoltaic Time-series Analysis Process Through Hybrid Distributed Computing”, CWRU CS MS Program, degree conferred May 2020.
16. Tian Wang, CWRU EMAE MS Program, “Effective Thermal Resistance of Commercial Buildings Using Data Analysis of Whole-Building Electricity Data” co-advised with A. Abramson, degree conferred May 2020.
15. Shreyas Kamath, CWRU EECS BS/MS Program, “Energy Use Intensities across Building Use Types and Climate Zones using the CBECS Dataset”, co-advised with A. Abramson, degree conferred May 2020.

2019

14. Alan Curran, CWRU EMSE MS Program, “Lifetime Performance Modeling of Commercial Photovoltaic Power Plants”, degree conferred August 2019.

2018

13. Xuan Ma, CWRU MAMS MS. ”Data-Driven Current-Voltage Feature Extractions and Time Series Analysis for Mechanistic Photovoltaic Module Degradation”, co-advised with J Brynsjardottir. degree conferred May 2018.
12. Justin Fada, CWRU EMAE BS/MS program, ”Performance and Degradation and Degradation Modes Analysis of PV Modules Determined from Quantitative Multimodal Electroluminescent Imagery Machine Learning”, co-advised with A. Abramson, degree conferred May 2018.

2016

11. Ethan Pickering, CWRU EMAE BS/MS program, ”EDIFES 0.4: Scalable Data Analytics for Commercial Building Virtual Energy Audits”, co-advised with A. Abramson, degree conferred August 2016.
10. Pei Zhao, CWRU EECS MS, co-advised with G. Q. Zhang, ”E-CRADLE v1.1 - An improved distributed system for Photovoltaic Informatics”, Degree conferred January 2016.

2015

9. Yingfang Ma, CWRU EMSE MS, ”Long-range Interactions and Second Virial Coefficients of Biomolecular Materials”, Degree conferred January 2015.

2014

8. Daniel Dryden, CWRU EMSE MS, "Long-Range Interactions in Biomolecular-Inorganic Assemblies", Degree conferred August 2014.
7. Ian Kidd, CWRU EMSE BS/MS program. "Object Dependent Properties of Multicomponent Acrylic Systems" Degree conferred August 2014.
6. Venkat Yashwanth Gunapati, co-advised with G. Q. Zhang, CWRU EECS MS, "Cloud Based Distributed Computing Platform for Multimodal Energy Data Streams". Degree conferred May 2014.
5. Yang Hu, CWRU EMSE MS, "PV Module Performance Under Real-world Test Conditions - A Data Analytics Approach", Degree conferred May 2014.
4. Mohammad Akram Hossain, co-advised with A. Abramson, CWRU EMAE MS, "Thermal Characteristics of Microinverters on Dual-axis Trackers" Degree conferred May 2014.
3. Heather Merlitz, nee Lemire, CWRU EMSE BS/MS program. "Degradation of Transparent Conductive Oxides: Mechanistic Insights and Interfacial Engineering" Degree conferred January 2014.

2013

2. Myles Murray, CWRU EMSE MS, "Development and Optimization of Back Surface Acrylic Solar mirrors to Assure 25 Year Lifetime Performance", MS conferred May 2013.

2012

1. Wei-Chun Lin, CWRU EMSE MS, "Non-Tracked Mirror-Augmented Photovoltaic Design & Performance", Degree conferred December 2012.

Ph. D. Thesis Advisor for:

Current

9. Arafath Nihar, CWRU CDS PhD, Co-advisor with Yinghui Wu. Degree expected May 2025.
8. Mohommad Redad Mehdi, CWRU EMSE PhD Program, "XRD Data Analysis Pipelines", co-advisor with Frank Ernst, PhD degree expected May 2026.
7. Tian Wang, CWRU CDS PhD, Advisor Roger French with Yinghui Wu. Degree expected May 2026,
6. Zhengwen Zhang, CWRU EMAE PhD Program, "TEA for Nitrogen Circular Economy", advisors Roger French, Chris Yuan, PhD degree expected May 2026.
5. Olatunde Akanbi, CWRU EMSE PhD Program, "Geospatiotemporal Analytics", co-advisor with Jeffrey Yarus, PhD degree expected in May 2027.
4. Tommy Ciardi, CWRU CDS MS Program, "XCT-image: High Speed Image Machine Learning for X-ray Computed Tomography Images", co-advisor Roger French with Yinghui Wu, PhD degree expected May 2027.
3. Johan Bachman, CWRU EMSE PhD Program, Co-advised with Matthew Willard, PhD degree expected May 2029
2. Isabella Giammettei, CWRU EMSE PhD Program, PhD degree expected May 2030.
1. Kyle Henrikson, CWRU EMSE PhD Program, PhD degree expected May 2030

Graduated

18. Sameera Nalin Venkat, Development of a Materials Data Science Framework for the Analysis of Phase Transformations and Similarity in Material Systems, PhD Thesis, CWRU, 2024.
17. JiQi Liu, CWRU EMSE PhD Program, "Degradation of Bifacial & Monofacial, Double Glass & Glass-Backsheet, Photovoltaic Modules with Multiple Packaging Combinations", Degree conferred August 2022.

16. Alan Curran, CWRU EMSE PhD Program and Applied Data Science University Graduate Certificate, "Reliability of Commercially Relevant Photovoltaic Cell and Packaging Combinations in Accelerated and Outdoor Environments", Degree conferred August 2021.
15. Ahmad Maroof Karimi, CWRU C&DS PhD Program, "Data Science and Machine Learning To Predict Degradation and Power of Photovoltaic Systems: Convolutional and Spatiotemporal Graph Neural Network". Degree conferred January 2021.
14. Menghong Wang, CWRU EMAC PhD Program, "Degradation of Photovoltaic Packaging Materials and Power Output of Photovoltaic Systems: Scaling up Materials Science with Data Science" Degree conferred August 2020.
13. Donghui Li, CWRU EMSE PhD Program, "Lifetime and Degradation Studies of Poly (Methyl Methacrylate) (PMMA) via Data-driven Methods". Degree conferred May 2020.
12. Arash Khalilnejad, CWRU EMAE PhD Program "Data-Driven Evaluation of HVAC Systems in Commercial Buildings and Identification of Savings Opportunities", co-advised with A. Abramson, degree conferred May 2020.
11. Yu Wang, CWRU EMSE PhD Program, "Bridging the Gap Between Accelerated and Field Aging of Photovoltaic Backsheets", degree conferred May 2019. Research Advisor: Laura S. Bruckman. Academic Advisor: Roger French.
10. Devin A. Gordon, CWRU EMAC PhD Program, "Quantifying the Weathering Induced Degradation of Poly(ethylene-terephthalate) via Spectroscopic Chemometrics and Statistical Modeling", degree conferred May 2019. Research Co-advisors: Laura S. Bruckman and Roger French. Academic Advisor: Roger French.
9. Mohammad Hossain, "Development of Building Markers and Unsupervised Non-intrusive Disaggregation Model for Commercial Buildings' Energy Usage", co-advised with A. Abramson, degree conferred May 2018.
8. Yingfang Ma, EMSE, CWRU. "Electronic Structure, Optical Properties and Long-Range-Interaction Driven Mesoscale Assembly", Degree conferred August 2017.
7. Yang Hu, EMSE, CWRU. "Temporal Change in the Power Production of Real-world Photovoltaic Systems Under Diverse Climatic Conditions". Degree conferred May 2017.
6. Nicholas Wheeler, EMAC, CWRU. "Lifetime and Degradation Science of Polymeric Encapsulant in Photovoltaic Systems: Investigating the Role of Ethylene Vinyl Acetate in Photovoltaic Module Performance Loss with Semi-gSEM Analytics" Degree conferred January 2017.
5. Abdulkerim Gok, CWRU "Degradation Pathway Models of Poly(ethylene-terephthalate) Under Accelerated Weathering Exposures", Degree conferred January 2016.
4. Rick Rajter: "Chirality-Dependent, van der Waals – London Dispersion Interactions of Carbon Nanotube Systems", Massachusetts Institute of Technology, 2008. Funded by NSF NIRT-GOALI Award to Lehigh University and Massachusetts Institute of Technology.
3. Jack Smith: "The Relationship Between Bonding, Structure and Optical Properties in Reactive Sputter Deposited Chrome Oxycarbonitride", University of Pennsylvania, 2001. With Prof. D. A. Bonnell. Funded by NSF GOALI Award to University of Pennsylvania.
2. Erik Thiele: "Scattering of Electromagnetic Radiation by Complex Microstructures in the Resonant Regime", University of Pennsylvania, 1998. Funded by DuPont Co.
1. Stephen Loughin: "Critical Point Analysis of the Interband Transitions of Electrons", University of Pennsylvania, 1992. Funded by General Electric.

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Post Doctoral Research Advisor for:
 Prior

13. Pawan Tripathi, “MDS3-COE Postdoc”, 1/2022 to 1/2024.
12. Erika Barcelos, “CASFER and MDS3-COE Postdoc”, 1/2022 to 1/2024.
11. Xuanji Yu, “PV-stGNN Modeling for Improved Performance Loss Rate Determination”, 12/2021 to present.
10. Jayvic Cristian Jimenez, “Materials Degradation and Lifetime Extension”, 10/2021 to 2023. Now at LLNL.
9. Jennifer L. Braid, “Degradation of PERC PV Modules and Towards 50 year PV Module Lifetimes”, Nov. 2016 to Sept. 2019. Now at Sandia.
8. Wei-Heng Huang, “Data-driven modeling of Materials Degradation under Real-world and Lab-based Exposures”, 1/2017 to March 2019
7. Mohamed Elsaeti, “Data Science and Analytics of PV Systems and Materials”, 8/2015 to 8/2016.
6. Yifan Xu, co-advised with Jiayang Sun “Data Science and Analytics of PV Systems”, 6/2013 to 6/2015.
5. Tim Peshek, “Microinverter and PV Power Plant Analytics” 3/2013 to 3/2015.
4. Laura S. Bruckman, “Mirror Augmented Photovoltaics: Photodegradation of PMMA Acrylic”, 8/2011 to 8/2015.
3. Youngwoo Yi, “Lifetime and Degradation Science of PV: Charge Carrier Dynamics at Silver-Silicon PV Cell interfaces”, 1/2012 to 1/2013.
2. Rick Rajter: “Chirality-Dependent, van der Waals – London Dispersion Interactions of Carbon Nanotube Systems”, Massachusetts Institute of Technology, 2009. Funded by NSF NIRT-GOALI Award to Lehigh University and Massachusetts Institute of Technology.
1. Guolong Tan: “VUV Spectroscopy and vdW-Ld Interaction in Nanometer Scale Amorphous Films”. Funded by NSF-EU NANOAM project with NSF Award to Massachusetts Institute of Technology and University of Pennsylvania, 2002-04.

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Current

1. Quynh Tran, “MDS3-COE Postdoc” , 1/2024 to present

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Thesis Committee Member for Masters or Ph.D. thesis students.

24. Ph. D, Thesis committee member, with Beverly Z. Saylor, Earth, Environmental, and Planetary Sciences, for Hope Edobor Omodolor, Utica Shale Studies, expected August 2024.
23. Ph. D. Thesis committee member, with Yue Li, Civil Engineering, for Weinan Li, “Reliability and Resilience Analysis of Water Distribution Systems When Subjected to Corrosions or Earthquakes”, expected May 2024.
22. Ph. D. Thesis committee member, with Alp Sehrioglu, for Kimberly Gliebe, “Processing-Structure-Property Relationships in Thin Film Layered Oxides” expected May 2023.
21. Ph. D. Thesis committee member, with Horst von Recum, for Jacob Kerner, “Application of machine learning algorithms to predict interactions between proteins and ligands”, MS degree conferred May Jan 2022.
20. Ph. D. Thesis committee member, with Darcy Freedman in Population & Quantitative Health Dept., for Roberto Martinez, “Time series analysis of SNAP spending at Farmers’ Markets in the State of Ohio”. Degree expected May 2021.
19. M. S. Thesis committee member, with Chirag Kharangate in EMAE, for Ari Bard, “Modeling and Predicting Heat Transfer Coefficients for Flow Boiling in Microchannels” degree conferred May 2021.

18. Ph. D. Thesis committee Member, with Alp Sehirlioglu, for Kevin Pachuta, "Exfoliation of Two-Dimensional Layered Transition Metal Oxides". Degree conferred May 2021.
17. Ph. D. Thesis committee member, with Chris Yuan, for Jingyi Zhang, "Life Cycle Sustainability Study of Perovskite Solar Cell Technologies". Degree conferred May 2019.
16. Ph. D. Thesis committee member, with Steven Eppel, for Li Li, "Charge Mapping Technique for Protein Corona Characterization". Degree conferred 2019.
15. M. S. Thesis committee Member, with Alp Sehirlioglu, for Kevin Pachuta, "Compositional Changes Associated with the Exfoliation of Lithium Cobalt Oxide into Atomically Thin CoO_2 Nanosheets". Degree conferred May 2018.
14. Ph. D. Thesis committee member, with Hongping Zhao, for Subrina Rafique, "Growth, Characterization and Device Demonstration of Ultra-wide Bandgap $\beta - Ga_2O_3$ by Low Pressure Chemical Vapor Deposition". Degree conferred December 2017.
13. Ph. D. Thesis committee member, with Hongping Zhao, for Lu Han, "Light Management in Photovoltaic Devices and Nanostructure Engineering in Nitride-based Optoelectronic Devices". Degree conferred February 2017.
12. Ph. D. Thesis committee member, with Xiong Yu, for Jianying Hu, "Polymeric Thermochromic Material for Improvement of Asphalt Pavement Durability", Case Western Reserve University, Civil Engineering, Degree conferred May 2016.
11. Ph. D. Thesis committee member, with V. Adrian Parsegian, for Jaime Hopkins, "Morphological and Materials Effects in van Der Waals Interactions", University of Massachusetts-Amherst, Physics Department, Degree conferred May 2016.
10. Masters Thesis committee member, with Prof. A. Abramson, for Aaron Hung, "Energy Efficiency and Statistical Analysis of Buildings at Case Western Reserve University", Case Western Reserve University, Mechanical Engineering, Degree conferred January 2016.
9. Ph. D. Thesis Committee, with Prof. Shu Yang, for Yongan Xu, "Fabrication of High Fidelity, High Index 3D Photonic Crystals Using a Templating Approach", Department of Materials Science, University of Pennsylvania, final defense October 2009.
8. Ph. D. Thesis Committee, with Prof. D. A. Bonnell, for Christopher Rankin, "Atomic Polarization and Local Reactivity on Organic Ferroelectric Surfaces: Engineering Fluoropolymer Films for Ferroelectric Nanolithography", Department of Materials Science, University of Pennsylvania. Graduated May 2007.
7. Ph. D. Thesis Co-advisor, with Prof. Manfred Rühle for Klaus van Benthem, "Electron Microscopic Investigation of the Bonding Behaviour Of Metals On $SrTiO_3$ Substrates", Universität Stuttgart and Max-Planck-Institut für Metallforschung Stuttgart, Graduated 2002.
6. Ph. D. Thesis Committee, with Prof. D. A. Bonnell, for Asa Frye, "Defect-induced Electrical/Optical Properties of $SrTiO_{3-x}$ (001) by Photo-assisted Tunneling Spectroscopy", Department of Materials Science, University of Pennsylvania. Graduated 2000.
5. Masters Thesis co-advisor, with Prof. Manfred Rühle and Harald Muellejans, for Albert Dorneich, "Spatially Resolved Electron Energy-loss Spectroscopy of Internal Interfaces in Ceramics", Diplomarbeit, University of Stuttgart, Stuttgart, Germany. Masters equivalent 1996.
4. Ph. D. Thesis Committee, with Prof. T. W. Coyle, for Hongmei Liao, "Stereolithography Using Compositions Containing Ceramic Powders", University of Toronto. Graduated 1997.
3. Ph. D. Thesis Committee, with Prof. Y. M. Chiang, for Harold Ackler, "Thermodynamic Calculations and Model Experiments on Thin Intergranular Amorphous Films in Ceramics", MIT. Graduated 1996.
2. Research Advisor, with Prof. R. L. Byer, for F. M. Schellenberg, "Linear And Nonlinear Spectroscopy in Polysilane Polymers", Ph. D., Stanford University. Granted 1991.

1. Research Advisor, with Prof. R. T. Swimm, for M. E. Innocenzi, "A Study of Room Temperature Optical Absorption in Undoped Aluminum-Oxide and Yttrium Aluminum Garnet", Ph. D., University of Southern California. Graduated 1990.

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11.3 Awards and Honors: Teaching

2. Nomination for Diekhoff Graduate Teaching Award, CWRU. (March 2012).
1. Professional development certificate in "Applying the Quality Matters Rubric (APPQMR)". Quality Matters (QM) leads quality assurance in online and innovative digital teaching and learning environments. Nov. 6, 2019. [Quality Matters](#); [Higher Education](#)

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LEADERSHIP AND SERVICE

12.1 Contributions to Department, School and University

12.1.1 Department Service

9. Committee Member, EMSE Graduate Committee. PhD Qualifier exam preparation. (2019-present)
8. Program Chair, CWRU-Kyocera Materials Data Science Symposium. (Monday July 30th, 2018)
7. Committee Member, EMSE Departmental Graduate Studies Committee. (September 2017-2019).
6. Committee Chair, EMSE/EMAC Synergy ad hoc committee. (September 2014 - May 2015).
5. Established Applied Data Science minor and DSCI courses in EMSE. (July 2013 - Nov. 2014).
4. Chairperson, Departmental Search Committee for Asst. Prof. of Electronic Ceramics. (March 2013 - May 2014).
3. Committee Member, EMSE Departmental Graduate Studies Committee. (September 2012 - 2014).
2. Faculty Mentor, CWRU Materials Research Society Student Chapter. (January 2013 - Present).
1. Committee Member, Departmental ad hoc Committee on Undergraduate Curriculum Renovation. (2011 - 2012).

12.1.2 College Service

18. University Graduate Certificate in Applied Data Science established 2021.
17. Member of the CSE Budget Committee, 2022
16. Chair of the CSE Budget Committee, 2018-2021.
15. Member of the EECS Computer Science Search Committee, 2018-2019.
14. Member of the CSE Tactical Research Ad hoc Committee, 2018.
13. Member of the EECS Computer Science Search Committee, 2017-2018.
12. Chair of the CSE Budget Committee, 2016-17.
11. Member of the CSE Budget Committee, 2016.
10. Working to establish graduate level, Applied Data Science in CSE, Jan. 2015 to present.
9. Faculty Director, Applied Data Science Undergraduate Minor program, Sept. 2014 to present.

8. Developed Applied Data Science minor in cooperation with Business Higher-Education Forum, July. 2013 - July. 2014
7. Member of the Case School of Engineering, Promotion and Tenure Committee, Sept. 2012.
6. Workshop Organizer, **Lifetime and Degradation Science Workshop**, 1-day workshop held at CWRU-CSE, 60 attendees, November 14th, 2012.
5. Workshop Organizer, **Solar Durability Workshop: Photovoltaics, LEDs and Other Outdoor Exposed Technologies**, held at CWRU-CSE, 1-day workshop, 95 attendees, April 2012.
4. Member of the CWRU School of Engineering Dean's Strategic Performance Plan Committee, AY11-12.
3. Member of the CSE Faculty Executive Committee for AY 2011-2012.
2. Member, Master and Continuing Education Task Force, Case School of Engineering, Spring 2011-12.
1. Member, Departmental Merger Committee of Case School of Engineering Faculty Senate, Spring 2011.

12.1.3 University Service

29. Member of the Vice President for Research, CWRU Faculty Distinguished Research Award committee for AY24.
28. Member of the Provost's university-wide AI Taskforce established to explore the impact of AI on student learning and teaching, AY24.
27. Member of the Faculty Senate Finance Committee, FY18-24.
26. Organizer of the 9th 2023 Tohoku/CWRU Data Science Symposium, held August 7-8, 2023 in Sendai Japan.
25. Organizer of the 8th 2022 Tohoku/CWRU Data Science Symposium, held August 8-9, 2022 in Cleveland Ohio.
24. Organizer of the 7th 2021 Tohoku/CWRU Data Science Symposium, held August 5-6, 2021, virtual.
23. Co-chair, with Glenn Starkmann, of the CWRU Research Infrastructure and Facilities Strategic Visioning Committee, FY20-21.
22. Chair of the CWRU ITS Advisory Committee on Research Computing, FY19-21.
21. Co-organizer, with Marc Chance (SOM) of the 6th 2020 Tohoku/CWRU Data Science Symposium, held August 8-9, 2020 in Sendai Japan.
20. Co-organizer, with Marc Chance (SOM) of the 5th 2019 Tohoku/CWRU Data Science Symposium, held August 5-6, 2019 in Cleveland OH.
19. Chair of the CWRU ITS Advisory Committee on Research Computing, FY18-19.
18. Co-organizer, with Tohoku University of the 2018 Tohoku/CWRU Data Science Symposium, held August 2-3, 2018 in Sendai Japan.
17. Co-organizer, with Marc Chance (SOM) of the 2017 Tohoku/CWRU Data Science Symposium, held August 3-4, 2017 in Cleveland OH.
16. Co-organizer, with Marc Chance (SOM) of the 2016 Tohoku/CWRU Data Science Symposium, held August 9-10, 2016 in Sendai Japan.
15. CSE representative establishing the CWRU/Tohoku University Global Universities, Data Science partnership encompassing Medicine and Engineering, 2015 to present.
14. Co-organizer, with Marc Chance (SOM) of the 2015 Tohoku/CWRU Data Science Symposium, Cleveland OH, July 2015.

13. Member of the Data Science Steering Committee, Sept. 2014 to present.
12. Member of CWRU, ITS, Advisory Committee on Research Computing Meeting, 2013 to present.
11. Member of Case Western Reserve University's Strategic Planning - Steering Committee. 2012.
10. Member of the CWRU Provost's Advisory Promotion and Tenure Committee, AY11-13.
9. Member of the CWRU ITS Advisory Committee on Research Computing, FY12-13.
8. Member of the Provost's search committee for the Dean of the Case School of Engineering, Fall 2011.
7. Member of the Energy Hiring Subcommittee of the Engineering Strategic Hiring Initiative, Fall 2010, Spring / Fall 2011, Spring 2012.
6. Reviewer for CWRU Provost of FY11 Interdisciplinary Alliance Investment Grant Competition, Spring 2011.
5. Ph.D. recruiter at Massachusetts Institute of Technology, Departments of Materials Science, Chemistry and Mechanical Engineering. Pre-screened applicants against DuPont open requisitions and interviewed potential candidates on-campus, 2007 and 2008.
4. Member of DuPont Experimental Station E356 Building Move Committee, responsible for assuring successful move of 60 PIs and technicians and their labs and equipment to other buildings on site as part of the DuPont Innovation Center renovation.
3. Established DuPont's Apex Team Leader Network to accelerate research and technology development programs across DuPont, 2006.
2. Performed technical due diligence assessments for two ceramic technology acquisitions when requested by business management. Performed a technical due diligence assessment of a semiconductor materials divestiture at the request of DuPont's Chief Technology Officer.
1. Led more than 12 DuPont Company monthly safety meetings with topics such as Toxic Substances Control Act, Sport Utility Vehicle Roll-over Hazards, Laser Safety, On-line Safety.

12.2 Professional Service and Leadership

12.2.1 Professional

73. Activity lead for Subtask 1.5 on PV+storage, in the IEA-PVPS Task 13 program. Since 2021-2025.
72. Program Chair, With Elizabeth Dickey, of Materials Research Society Symposium on **Materials Data Science: Transformations in Interdisciplinary Education** to be held December 2019, Boston MA.
71. Activity lead for Subtask 2.5 on Performance Loss Rate Determination of PV Power Systems, in the IEA-PVPS Task 13 program. 2018-2021.
70. Founder, with Alexis R. Abramson, of Edifice Analytics Inc., a startup working to commercialize the "Energy Diagnostics Investigator for Energy Savings (EDIFES)" data analytics for performing virtual energy audits of commercial buildings, using distributed and high performance computing, 2019.
69. Co-chair, with Karl-Anders Weiss (Fraunhofer Institute for Solar Energy), of 49th IEEE Photovoltaics Specialist Conference, Area 8: Module and System Reliability, Philadelphia PA, June 5-10, 2022.
68. **Editorial Board Member for SN Applied Sciences**, a journal of Springer/Nature Publishing Group, September 2018 to present.
67. **Editorial Board Member of Scientific Reports**, a journal of Springer/Nature Publishing Group, for Materials Physics and Energy, May 2015 to present.

66. Member of the US Delegation to the International Energy Agency's Photovoltaic Power Systems Program (IEA-PVPS) Task 13 "Performance and Reliability of Photovoltaic Systems". <https://www.iea-pvps.org/>, 2015 to present.
65. Member of the Standards Technical Panel (STP) for Underwriters Laboratories UL 1703 on "Flat-Plate Photovoltaic Modules and Panels", 2014 to present.
64. U. S. Department of Energy, Basic Energy Sciences Advisory Committee (BESAC), Transformative Opportunities in Energy Science subcommittee member, January 2014 for 2 years.
63. International Electrotechnical Commission, Technical Committee TC82 on Solar photovoltaic energy systems, committee member, Jan 1 2014 to present.
62. Member of Underwriters Laboratories, UL Energy Council, Since 2014.
61. ASTM Committee G03-08 on Weathering and Durability: Service Life Prediction Committee Member, since Jan 1, 2013.
60. ASTM Committee E44-09 on Solar, Geothermal and Other Alternative Energy Sources: Photovoltaic Electric Power Conversion, subcommittee member, since Jan 1, 2013.
59. NSF review panel for the Division of Engineering Education & Centers (ENG/EEC), SBIR, February 21, 2013.
58. Member of the IEEE EnergyTech 2012 conference organizing committee, at CWRU May 2012.
57. Poster Chair for the IEEE EnergyTech 2012 conference, at CWRU May 2012.
56. NSF SBIR Phase I panel reviewer for Photovoltaics, Washington, DC, February 15, 2012.
55. Member, International PV Module Quality Assurance Task Force, established by NREL, AIST, PVTEC, U. S. DOE, EU JRC, SEMI PV Group to develop PV Lifetime Qualification Testing, 2012.
54. Member of the University of California – Davis, Chemical Engineering and Materials Science Department's Board of Advisors, 2012-2014.
53. Workshop Organizer, **Long Range Interactions in Biomolecular Materials Workshop**, held at CWRU-CSE, 4 days, August 2012.
52. U. S. Department of Energy, Basic Energy Sciences Advisory Committee (BESAC), August 2012 for a second 2 year term.
51. NSF review panel for the Division of Engineering Education & Centers (ENG/EEC), SBIR, July 23, 2012.
50. International Organizing Committee for 4th, 5th, 6th, 7th, 8th International Workshops on Interfaces, Spain, 1999, 2002, 2005, 2008, 2011. Santiago de Compostela, Spain.
49. NIST-UL Workshop on Polymers in PV, Gaithersburg MD, March 3rd, 2011.
48. Member of Program Committee, IEEE EnergyTech 2011 conference, Cleveland, OH, May 2011.
47. Member of Program Committee, IEEE Photovoltaics Specialist Conference (PVSC) 37, Seattle, WA, June 2011.
46. Session Chair, Area 3, IEEE Photovoltaics Specialist Conference (PVSC) 37, Seattle WA, June 2011.
45. Reviewer for Physical Review B, Acta Materialia, International Journal of Materials Research (formerly: Zeitschrift fuer Metallkunde), Journal of Micro/Nanolithography, MEMS, and MOEMS of SPIE, Journal of Biological Physics, Biomedical Optics Express of the Optical Society of America.
44. U. S. Department of Energy, Basic Energy Sciences Advisory Committee (BESAC), Mesoscale Sciences subcommittee member, January 2011 for 2 years.

43. "Sustainability: A Materials Usage & Scarcity Perspective" presentation to CWRU Provost's Strategic Planning Leadership Retreat, Nov. 10th, 2010.
42. U. S. D. O. E. Workshop on Science for Energy Technology, Member of PV Panel, DOE Basic Energy Science Advisory Committee, Bethesda, MD, January 2010.
41. Appointed as a Special Government Employee to serve on the U. S. Department of Energy, Basic Energy Sciences Advisory Committee (BESAC). August 2010 for a 2 year term.
40. NIST-UL Workshop on Polymers in PV, Gaithersburg, MD, September 2010.
39. Member of Program Committee, SPIE Conference on Optical Microlithography XXI, San Jose, 2009.
38. Member of Committee of Visitors for the Materials Sciences and Engineering Programs in the Office of Basic Energy Sciences of the U. S. Department of Energy, March 2009.
37. Keynote Topic Editor, with Thomas Shaw, Annual Reviews of Materials Research, Volume on "Materials for CMOS and Beyond", July 2009.
36. Nominated for Position on U. S. Department of Energy, Basic Energy Sciences Advisory Committee (BESAC). Fall 2009.
35. Materials and Metrology Breakout Leader for U. S. Department of Energy, Energy Efficiency and Renewable Energy, Photovoltaic Science and Technology, PV Technology Roadmap Workshop with SEMI-PV Group, San Francisco, July 2009.
34. Member, since 2009, of PV Industry Collaboration Team, a working team of SEMI-PV, to promote global industry and supply chain collaboration, pre-competitive research and PV technology roadmapping.
33. Member of Program Committee, SPIE Conference on Optical Microlithography XXI, San Jose, 2008.
32. Kavli Institute for Theoretical Physics, University Of California at Santa Barbara, Program on "Theory and Practice of Fluctuation-Induced Interactions", Invited participant, October 13-17, 2008.
31. Session Chair, SPIE Conference on Optical Microlithography XX, February / March 2, San Jose, 2007.
30. Chair, with V. A. Parsegian, of U. S. Dept. of Energy, Materials Science Council Workshop on **Long Range Interactions in Nanoscale Science**, Annapolis, Md., October 2007.
29. Symposium Organizer, "Ceramics and Technology Roadmaps: Opportunities in Industry, Technology and Research", American Ceramic Society 2004 Annual Meeting, Indianapolis, 2004.
28. Meeting Trustee, Wilmington Monthly Meeting of Friends, 2004-2010.
27. Member of the Council on Materials Science and Engineering of the Division of Materials Science and Engineering, United States Department of Energy, 2004-2012.
26. Member of Committee of Visitors for the Materials Sciences and Engineering Programs in the Office of Basic Energy Sciences of the U. S. Department of Energy, March 2003.
25. Visiting Scientist in the laboratory of Prof. Manfred Rühle, Max-Planck-Institut für Metallforschung Stuttgart, 1 month per year, from 1993 to 2002.
24. Session Chair, International Symposium on Advanced Nitrides, American Ceramic Society, Annual Meeting, Indianapolis IN, 2001.
23. Member, American Ceramic Society Meetings Committee - Long Range Planning, 2001-2004.
22. Guest Editor, Topical Issue on Ceramic and Bimaterial Interfaces: Designing for Properties, **Acta Materialia**, 2000.
21. Member of the Board of Directors of the American Ceramic Society, May 2000 to May 2003.

20. Participant, Semiconductor Industry Association Roadmap Committee, Technology Working Group on Lithography, 1999 roadmap revision.
19. Officer of the Basic Science Division, American Ceramic Society, 1997 to 2001.
18. Associate Editor, Topical Issue on "Atomic Bonding and Spectroscopy of Internal Interfaces", **Journal of Physics D**, **29**, July 1996.
17. Program Chair, with W. Craig Carter, Annual Meeting, Basic Science Division, American Ceramic Society, April 1996.
16. Vice Chairman, Gordon Research Conference on Solid State Studies in Ceramics, July 1996 and August 1997.
15. Program Chair, International Workshop on the "Atomic Bonding and Spectroscopy of Internal Interfaces", Schloss Ringberg, Max Planck Institut, Germany, April 1995.
14. Program Chair, Fall Basic Science Division Meeting, "Microstructure: Controlling Complexity", American Ceramic Society, New Orleans, LA, November 1995.
13. Program Chair, International Workshop on the "Interfaces in Ionic Materials", Schloss Ringberg, Max Planck Institut, Germany, March 1994.
12. Program Chair, International Workshop on the "Science of Al₂O₃", Schloss Ringberg, Max Planck Institut, Germany, March 15 to 19, 1993.
11. Program Chair, Symposium on "Bulk and Interfacial Electronic Structure of Ceramics", 94th Annual Meeting of the American Ceramic Society, Minneapolis, MN, 1992.
10. National Science Foundation, Materials Research Lab Program, Mail Reviewer and Site Review Panel, 1992.
9. Session Chair, Basic Science Division, American Ceramic Society, Annual Meeting, Cincinnati, OH, 1991.
8. Session Chair, American Ceramic Society Basic Science Division Fall Meeting, 1991.
7. Committee Member, Intersociety Liaison, American Ceramic Society, 1991-92.
6. D. O. E. Research Assistance Task Force Member for Basic Energy Sciences and Fusion Energy Office, on "Radiation Enhanced Electrical Degradation of Ceramics", Vail, CO, May 1991. Report published in Journal of Nuclear Materials.
5. Program Chair, Symposium on Electronic Structure of Ceramics, sponsored by the Basic Science, Electronics, and Engineering Ceramics divisions of the American Ceramic Society, 92nd Annual Meeting of the American Ceramic Society, Dallas, TX, April 22 to 26, 1990.
4. <https://ceramics.onlinelibrary.wiley.com/hub/journal/15512916/homepage/editorialboard>, since 1989, including topical issue editor for "Electronic Structure of Ceramics" (1990) and "Science of Al₂O₃" (1993).
3. Session Chair, Basic Science Division, American Ceramic Society Annual Meeting, Indianapolis, IN, April 1989.
2. Session Chair, Zirconia IV meeting, International Ceramic Congress, Anaheim, CA., Nov. 1989.
1. Session Chair, Symposium on Non Linear Optics, Amer. Ceram. Soc. Basic Science Fall Meeting, San Francisco, Oct. 21-23, 1988.

CONSULTING

8. For Profit Organization, Jinko Solar, US, (December 2020 - December 2022).
7. For Profit Organization, St. Gobain, Massachusetts. (November 5, 2012).
6. For Profit Organization, Ashland Chemicals, Specialty Ingredients Division, Delaware. (September 10, 2012 - October 20, 2013).
5. For Profit Organization, St. Gobain, Massachusetts. (November 5, 2013).
4. For Profit Organization, Rambus, Ohio. (November 2012 - December 2013).
3. For Profit Organization, Baker Hughes, Houston TX. (April 21st, 2014)
2. For Profit Organization, St. Gobain, Massachusetts. (April 28, 2014 - April 30, 2014).
1. For Profit Organization, St. Gobain, Massachusetts. (May 30th, 2018)