

MYUNGKOO KANG, Ph.D.

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EDUCATION

1. *B.S. in Materials Science & Engineering*, Seoul National University, Seoul, Korea (Feb 2006)
2. *M.S. in Materials Science & Engineering*, Seoul National University, Seoul, Korea (Feb 2008)
Thesis: The Hydroxyl-Quenching-Related Photoluminescence Properties of $\text{SnO}_2:\text{Eu}^{3+}$ Nanoparticles, Advisor: Prof. Byungwoo Park
3. *Ph.D. in Materials Science & Engineering*, University of Michigan, Ann Arbor, MI (May 2014)
Thesis: Formation and Properties of Metallic Nanoparticles on Compound Semiconductor Surfaces, Advisor: Prof. Rachel S. Goldman

PROFESSIONAL EXPERIENCE

1. *Assistant Professor*, Ceramic Engineering Program, Alfred University (2023 - Present)
2. *Research Scientist*, University of Central Florida (2017 - 2023)
3. *Postdoctoral Research Fellow*, Pennsylvania State University (2014 - 2016)
4. *Graduate Student Research Assistant*, University of Michigan (2008 - 2014)
5. *Graduate Student Instructor*, University of Michigan (2010)
6. *Air Traffic Control Operator*, Republic of Korea Air Force (2002 - 2004)

HONORS, AWARDS, AND SCHOLARSHIPS

1. Karl Schwartzwalder-Professional Achievement in Ceramic Engineering Award (2018).
2. The honorable mention in the ProQuest Distinguished Dissertation Awards for 2014 (2015)
3. The Poster Award Winner in Materials Research Society (MRS) Meeting (2010)
4. The best award for research presentation in the University of Michigan's Electron Microscopy Analysis Laboratory (EMAL) 40th Anniversary Symposium (2009)
5. The 3rd prize for the presentation in Samsung LCD Business Division internship (2005)
6. The 33rd Annual United Service Organization Six Star Salute (2004)
7. Seoul National University Alumni Association Scholarship (2002)
8. Full scholarships awarded by Seoul National University (1999, 2000, 2001, 2004, and 2005)
9. The third prize at 25th Seoul Science Contest (1997)

RESEARCH GRANTS

Under Review:

1. *Title:* Fabrication and Multi-Modal *In Situ* Magneto-Optical-Structural Characterization of Athermal High Verdet Constant Te-As-Se Chalcogenide Glasses
Funding Agency: National Science Foundation
Role: PI (co-PI: Prof. Mario Caccia at Alfred University)
Amount: \$180,000
Period: Sep 2026 – Aug 2028

2. *Title:* CAREER: Scalable Fabrication and Multi-Scale *In-Situ* Characterization of High Figure-of-Merit Ultra-Stable Monolithic Gradient Refractive Index Glass-Ceramic Nanocomposites
Funding Agency: National Science Foundation
Role: PI
Amount: \$500,000
Period: Jan 2026 – Dec 2030
3. *Title:* DURIP: Acquisition of a Multifunctional Laser-Pulsed 3-D Atom Probe Microscope
Funding Agency: Army Research Office
Role: PI (co-PIs: Prof. Scott T. Misture at Alfred University)
Amount: \$1,7500,000
Period: Jan 2026 - Dec 2026

Granted:

4. *Title:* MRI: Acquisition of an In-Situ Infrared Spectroscopic Ellipsometer
Funding Agency: National Science Foundation
Role: PI (co-PIs: Prof. S. K. Sundaram and Prof. Mehdi Kabirnejafi at Alfred University)
Amount: \$347,740
Period: Aug 2024 - Jul 2026
5. *Title:* Fabrication of Scaled-Up Gradient Refractive Index Bulk Glass-Ceramics via Gradient Thermal Treatment
Funding Agency: Physical Sciences Inc
Role: co-PI (PI: Dr. Nicholas Kochan at Physical Sciences Inc, co-PI: Prof. S. K. Sundaram at Alfred University)
Amount: \$4,500
Period: May 2024 - June 2024
6. *Title:* Evaluation of Dual Band IR Gradient Refractive Index Strategies for SWaP Reduction
Funding Agency: Defense Advanced Research Project Agency
Role: co-PI (PI: Prof. Kathleen A. Richardson at the University of Central Florida, co-PIs: Prof. Ilya Mingareev at Florida Institute of Technology, Prof. Douglas Warner at Pennsylvania State University, Prof. Sawyer D. Campbell at Pennsylvania State University, and Prof. Juejun Hu at Massachusetts Institute of Technology)
Amount: \$750,000
Period: Jun 2024 - Dec 2025
7. *Title:* ASCENT: Phase-change Reconfigurable Optical Wavefront Synthesis System
Funding Agency: National Science Foundation
Role: co-PI (PI: Prof. Juejun Hu at Massachusetts Institute of Technology, co-PIs: Prof. S. J. Ben Yoo at the University of California Davis, Prof. Hualiang Zhang at the University of Massachusetts Lowell, Dr. Tian Gu at Massachusetts Institute of Technology, and Dr. Hyung Jung Kim at National Aeronautics and Space Administration)
Amount: \$1,500,000
Period: Sep 2021 - Aug 2025
8. *Title:* Data Compilation for Gradient Refractive Index Optical Design Study
Funding Agency: Defense Advanced Research Project Agency
Role: PI (co-PI: Prof. Kathleen A. Richardson at the University of Central Florida)
Amount: \$50,000
Period: Jun 2022 - Jan 2023
9. *Title:* Broadband Diffraction Grating for Ultra-Short Pulse Compression

Funding Agency: Air Force Office of Scientific Research

Role: Subcontractor (PI & co-PI: Dr. Brad Pindzola & Dr. Matthew Murachver at Triton Systems, Inc.)

Amount: \$30,000

Period: Nov 2022 - May 2023

10. *Title:* Research Mentorship Program

Funding Agency: The Office of Research at the University of Central Florida

Role: co-PI (PI: Prof. Kathleen A. Richardson at the University of Central Florida)

Amount: \$2,000

Period: Jul 2020 - Jun 2021

11. *Title:* Evaluation of Longwave Infrared GRIN Component

Funding Agency: BAE Systems

Role: co-PI (PI: Prof. Kathleen A. Richardson at the University of Central Florida, co-PI: Prof. Ilya Mingareev at Florida Institute of Technology)

Amount: \$2,000

Period: Jul 2017 - Nov 2018

PEER-REVIEWED JOURNAL PUBLICATIONS

To be submitted:

1. K. A. Matthies, Zephyr G. Ramsey, G. B. J. Sop Tagne, S. Banker, R. Sharma, K. A. Richardson, **M. Kang**, and S. K. Sundaram*, “Terahertz Properties of Multicomponent Chalcogenide Glasses and Glass-Ceramics” *in preparation*
2. L. Tran, G. B. J. Sop Tagne, E. A. Yamac, D. Wiedeman, R. Sharma, K. A. Richardson, R. S. Welch, C. Bragatto, R. Loucks, C. J. Wilkinson, and **M. Kang***, “Atomistic Origins of the Accelerated Low-Temperature Glass Relaxation via Thermo-Ultrasonication,” *in preparation*
3. Z. G. Ramsey, G. B. J. Sop Tagne, L. Tran, J. E. Lyza, N. Kosan, S. Banker, R. Sharma, X. Huang, A. Pattammattel, H. Yan, K. A. Richardson, D. G. Stohr, K. Wang, S. T. Misture, and **M. Kang***, “*In-Situ* Spatio-Spectral-Microstructural Characterization-Guided Optimization of Crystallization in Multicomponent Chalcogenide Glasses for the Realization of High Figure-of-Merit Gradient Refractive Index Materials,” *in preparation*
4. G. B. J. Sop Tagne, S. Son, B. M. Triplett, M. Y. Shalaginov, S. Deckoff-Jones, J. Cook, C. M. Schwarz, I. Divliansky, M. C. Richardson, J. Hu, T. Gu, C. Rivero-Baleine, K. A. Richardson, **M. Kang***, “On Optical Nonlinearity and Spatial Fidelity in Direct Laser Writing Process for the Realization of Diffractive-Refractive Aberration Corrected Lenses,” *in preparation*

Under review:

5. G. B. J. Sop Tagne,[†] Z. G. Ramsey,[†] L. Tran, A. M. Teijeira, K. A. Matthies, J. E. Lyza, P. E. Lynch, C. J. Cano, P. M. Marrero, R. A. Alvarez-Aguirre, D. Wiedeman, R. Sharma, S. Banker, C. Kosan, N. S. Kochan, K. A. Richardson, S. A. Feller, R. S. Welch, S. T. Misture, D. G. Stohr, K. Wang, S. K. Sundaram, and **M. Kang,*** “Scalable Manufacturing and Multi-faceted Cross-Correlating Characterization of Low-Dispersion Bulk Gradient Refractive Index Chalcogenide Materials,” *under review*

Published:

6. C. Kosan, S. Banker, R. Sharma, A. Howe, G. B. J. Sop Tagne, Z. G. Ramsey, C. I. Padilla, J. LaPlante, B. Zerbe, Z. Xu, I. Mingareev, J. Hu, **M. Kang**, S. D. Campbell, D. H. Werner, and K. A. Richardson*, “Commercial Viability of Infrared Gradient Index Optical Elements,” *in press, Int. J. Appl. Glass Sci.* (2026).

7. A. Ashjari*, A. Ogrinc, R. F. Lancelotti, R. Youngman, H. Bradtmuller, **M. Kang**, S. H. Kim, and D. Moncke, “On the Ambivalent Structural Role of Indium in Aluminoborosilicate Glass: A Multi-Spectroscopic Study,” *in press, Acta Mater.* (2026).
8. P. E. Lynch,[†] L. Tran,[†] E. A. Yamac, G. B. J. Sop Tagne, C. J. Cano, P. M. Marrero, A. J. Phillips, R. S. Welch, D. Wiedeman, R. Sharma, K. A. Richardson, S. A. Feller, W. LaCourse, S. I. Yaniger, C. J. Wilkinson, and **M. Kang***, “Accelerated Low-Temperature Stabilization of Glasses via Thermo-Ultrasonication,” *MRS Bull.* **50**, 830 (2025). [[†]: **Equal contribution, selected as the cover issue of the 2025 July issue**]
9. T. J. Loretz*, R. Sharma, A. Zachariou, R. A. Loretz, **M. Kang**, and K. A. Richardson, “A Physics-based Measurement Protocol for Determining the True Glass Transition Temperature of Chalcogenide Glasses by Differential Scanning Calorimetry,” *in press, J. Opt. Photon. Res.* (2025).
10. C. C. Popescu, K. Aryana, B. Mills, T. W. Lee, L. M. Monier, L. Ranno, J. Xu, B. Sia, K. P. Dao, H.-B. Bae, V. Liberman, S. Vitale, **M. Kang**, K. A. Richardson, C. A. R. Ocampo, D. Calahan, Y. Zhang, W. M. Humphreys, H. J. Kim*, T. Gu, and J. Hu*, “Understanding and circumventing failure mechanisms in chalcogenide optical phase change material Ge₂Sb₂Se₄Te,” *Adv. Opt. Mater.* **13**, 2402751 (2025).
11. R. Alvarez*, A. Zachariou, I. Mingareev, T. J. Loretz, R. Sharma, J. Cook, C. Blanco, M. C. Richardson, A. Howe, P. E. Lynch, G. B. J. Sop Tagne, K. Wang, **M. Kang**, and K. Richardson, “Demonstration of Photothermally-Induced GRIN Profiles in Bulk Chalcogenide GAP-Se Glasses,” *Adv. Opt. Mater.* **12**, 2401552 (2024).
12. C. C. Popescu[†], K. Aryana[†], P. Garud, K. P. Dao, S. Vitale, V. Liberman, H.-B. Bae, T.-W. Lee, **M. Kang**, K. A. Richardson, C. A. R. Ocampo, Y. Zhang, T. Gu, J. Hu, and H. J. Kim*, “Electrically phase-change reconfigurable metasurface transmissive optical filter,” *Adv. Mater.* **36**, 2400627 (2024).
13. **M. Kang***, R. Sharma, C. Blanco, D. Wiedeman, Q. Altemose, P. E. Lynch, G. B. J. Sop Tagne, Y. Zhang, M. Y. Shalaginov, C.-C. Popescu, B. M. Triplett, C. Rivero-Baleine, C. M. Schwarz, A. M. Agarwal, T. Gu, J. Hu, and K. A. Richardson, “Solution-Derived Ge-Sb-Se-Te Phase-Change Chalcogenide Films,” *Sci. Rep.* **14**, 18151 (2024).
14. **M. Kang***, B.-U. Sohn, Q. Du, D. Ma, R. Pujari, L. Siskin, C. Blanco, C. Goncalves, C. Arias, A. Yadav, A. Zachariou, P. E. Lynch, J. Lee, S. Novak, C. M. Schwarz, I. Luzinov, J. Hu, A. M. Agarwal, D. T. H. Tan, and K. A. Richardson, “Self-Healing Mechanisms for Ge-Sb-S Chalcogenide Glasses Upon Gamma Irradiation,” *MRS Bull.* **49**, 778 (2024). [**Selected as the cover issue of the 2025 July issue**]
15. **M. Kang**^{†*}, B. M. Triplett[†], M. Y. Shalaginov[†], S. Deckoff-Jones, C. Blanco, M. Truman, E. V. Shirshneva-Vashchenko, J. Cook, T. S. Karnik, Q. Du, C.-C. Popescu, A. Zachariou, Y. Zhang, C. M. Schwarz, S. An, C. Fowler, H. Zhang, I. Divliansky, L. B. Glebov, M. C. Richardson, A. M. Agarwal, C. Rivero-Baleine, J. Hu, T. Gu*, and K. A. Richardson, “Photochemically-Patterned Large-Area Arsenic Sulfide Micro-Gratings for Hybrid Diffractive-Refractive Platforms,” *Adv. Photonics Res.* **5**, 2300241 (2024). [[†]: **Equal contribution, selected as the cover issue of the 2024 January issue**]
16. C.-C. Popescu, K. P. Dao, L. Ranno, B. Mills, L. Martin, Y. Zhang, D. Bono, B. Neltner, T. Gu, J. Hu*, K. Aryana, H. J. Kim*, S. Vitale, P. Miller, C. Roberts, S. Geiger, D. Callahan, M. Moebius, **M. Kang**, K. Richardson, and C. Rios, “An Open-Source Multi-functional Testing Platform for Optical Phase Change Materials,” *Small Sci.* **3**, 2300098 (2023).
17. B. Butkus, A. Kostogiannes, A. Howe, **M. Kang**, R. Gaume, K. A. Richardson, and P.

- Banerjee*, “Zinc Sulfide CVD Optical Ceramic Analyzed by XPS,” *Solid State Sci.* **30**, 024019 (2023).
18. P. Prabhathan, K. V. Sreekanth, J. Teng, J. H. Ko, Y. J. Yoo, H.-H. Jeong, Y. Lee, S. Zhang, T. Cao, C.-C. Popescu, B. Mills, T. Gu, Z. Fang, R. Chen, H. Tong, Y. Wang, Q. He, Y. Lu, Z. Liu, H. Yu, A. Mandal, Y. Cui, A. S. Ansari, V. Bhingardive, **M. Kang**, C. K. Lai, M. Merklein, M. J. Müller, Y. M. Song, Z. Tian, J. Hu, M. Losurdo, A. Majumdar, X. Miao, X. Chen, B. Gholipour, K. A. Richardson, B. J. Eggleton, K. Sharda*, M. Wuttig*, and R. Singh*, “A Roadmap for Phase Change Materials in Photonics and Beyond”, *iScience* **26**, 107946 (2023).
[Invited as part of a keynote article entitled “PCM Photonics Roadmap 2023” in a special topical issue entitled “Phase Change Materials for Photonics”]
 19. J. Meng, Y. Gui, B. M. Nouri, G. Comanescu, X. Ma, Y. Zhang, C. C. Popescu, **M. Kang**, M. Miscuglio, N. Peserico, K. Richardson, J. Hu, H. Dalir, and V. J. Sorger*, “Electrical Programmable Multi-Level Non-volatile Photonic Random-Access Memory,” *Light Sci. Appl.* **12**, 189 (2023).
 20. B. Butkus, M. Havel, A. Kostogiannes, A. Howe, **M. Kang**, R. Gaume, K. A. Richardson, and P. Banerjee*, “Calcium Sulfide Powder Analyzed by XPS,” *Solid State Sci.* **30**, 014005 (2023).
 21. B. Butkus, M. Havel, A. Kostogiannes, A. Howe, **M. Kang**, R. Gaume, K. A. Richardson, and P. Banerjee*, “Lanthanum Sulfide Powder Analyzed by XPS”, *Solid State Sci.* **30**, 014001 (2023).
 22. M. Havel*, A. Kostogiannes, W. T. Shoulders, V. Blair, D. McGill, C. Rivero-Baleine, R. Bunijevac, J. Eichler, M. R. Kincer, **M. Kang**, K. A. Richardson, and R. Gaume, “Monitoring sulfur loss in polycrystalline solid solutions of CaS-La₂S₃ by Raman spectroscopy and x-ray diffraction,” *Opt. Mater. Express* **13**, 504 (2023).
 23. C. Rios*, Q. Du, Y. Zhang, C. C. Popescu, M. Shalaginov, P. Miller, C. Roberts, **M. Kang**, K. A. Richardson, T. Gu, S. Vitale, and J. Hu*, “Ultra-compact nonvolatile phase shifter based on electrically reprogrammable transparent phase change materials,” *Photonix* **3**, 1 (2022).
 24. A. Kostogiannes, R. Sharma, A. Howe, M. Chazot, **M. Kang**, J. Cook, K. Schepler, and K. Richardson*, “The role of powder handling on resulting impurities in ZnSe-doped As-S-Se composite materials,” *Opt. Mater. Express* **12**, 4287 (2022).
 25. S. Vitale*, P. Miller, P. Robinson, C. Roberts, V. Liberman, C. Rios, Q. Du, Y. Zhang, C. C. Popescu, M. Y. Shalaginov, **M. Kang**, K. A. Richardson, and J. Hu, “Phase Transformation and Switching Behavior of Magnetron Plasma Sputtered Ge₂Sb₂Se₄Te,” *Adv. Photonics Res.* **3**, 2200202 (2022).
 26. P. S. Shirshnev*, **M. Kang**, I. Divliansky, K. A. Richardson, and L. B. Glebov, “Engineered refractive and diffractive optical composites via photo-thermal processes,” *Opt. Mater. Express* **12**, 3429 (2022). [Invited article in a special topical issue entitled “Celebrating Optical Glass: The International Year of Glass 2022”]
 27. F. Yang[†], H.-I. Lin[†], M. Y. Shalaginov[†], K. Stoll, S. An, C. Rivero-Baleine, **M. Kang**, A. Agarwal, K. Richardson, H. Zhang, J. Hu*, and T. Gu*, “Reconfigurable parafocal zoom metalens,” *Adv. Opt. Mater.* **10**, 2200721 (2022).
 28. L. Karam, R. Alvarado, F. Calzavara, R. Dahmani, **M. Kang**, C. Blanco, F. Adamietz, K. Richardson, and M. Dussauze*, “Spatially microstructured topology of chalcogenide glasses by a combination of the electrothermal process and selective etching for functional infrared media,” *Opt. Mater. Express* **12**, 1920 (2022).
 29. S. An, B. Zheng, M. Y. Shalaginov, H. Tang, H. Li, L. Zhou, Y. Dong, M. Haerinia, A. M. Agarwal, C. Rivero-Baleine, **M. Kang**, K. A. Richardson, T. Gu, J. Hu, C. Fowler, and H.

- Zhang*, “Deep Convolutional Neural Networks to Predict Mutual Coupling Effects in Metasurfaces,” *Adv. Opt. Mater.* **10**, 2102113 (2022).
30. M. Chazot, A. Kostogiannes, M. Julian, C. Feit, J. Sosa, **M. Kang**, C. Blanco, J. Cook, V. Rodriguez, F. Adamietz, D. Verreault, P. Banerjee, K. Schepler, M. C. Richardson, and K. A. Richardson*, “Enhancement of ZnSe stability during optical composite processing via atomic layer deposition,” *J. Non-Cryst. Solids* **576**, 121259 (2022).
 31. Y. Zhang*, Q. Zhang, C. Rios, M. Shalaginov, J. B. Chou, C. Roberts, P. Miller, P. Robinson, V. Liberman, S. Vitale, **M. Kang**, K. Richardson, T. Gu, and J. Hu, “Transient tap coupler for wafer-level photonic testing based on optical phase change materials,” *ACS Photonics* **8**, 1903 (2021).
 32. Y. Zhang, C. Fowler, J. Liang, B. Azhar, M. Y. Shalaginov, S. An, J. B. Chou, C. M. Roberts, V. Liberman, **M. Kang**, C. Rios, K. Richardson, C. Rivero-Baleine, T. Gu, H. Zhang*, and J. Hu*, “Electrically Reconfigurable Nonvolatile Metasurface Using Low-Loss Optical Phase Change Material,” *Nat. Nanotech.* **10**, 1038 (2021).
 33. **M. Kang**[†], I. Martin[†], R. Sharma, C. Blanco, S. Antonov, T. J. Prosa, D. J. Larson, H. Francois-Saint-Cyr*, and K. A. Richardson*, “Unveiling True 3-D Nanoscale Microstructural Evolution in Chalcogenide Nanocomposites: a Roadmap for Advanced Infrared Functionality,” *Adv. Opt. Mater.* **9**, 2002092 (2021). [[†]: **Equal contribution**]
 34. M. Y. Shalaginov[†], S. An[†], Y. Zhang, F. Yang, P. Su, V. Liberman, J. B. Chou, C. M. Roberts, **M. Kang**, C. Rios, Q. Du, C. Fowler, A. Agarwal, K. Richardson, C. Rivero-Baleine, H. Zhang*, J. Hu*, and T. Gu*, “Reconfigurable all-dielectric metalens with diffraction-limited performance,” *Nat. Commun.* **12**, 1225 (2021). [[†]: **Equal contribution**]
 35. C. M. Schwarz*, S. M. Kuebler, C. Rivero-Baleine, B. Triplett, **M. Kang**, Q. Altemose, C. Blanco, K. A. Richardson, Q. Du, S. Deckoff-Jones, J. Hu, Y. Zhang, Y. Pan, and C. Rios, “Structurally and morphologically engineered chalcogenide materials for optical and photonic devices,” *J. Opt. Microsyst.* **1**, 013502 (2021).
 36. S. An, B. Zheng, H. Tang, M. Y. Shalaginov, L. Zhou, H. Li, **M. Kang**, K. A. Richardson, T. Gu, J. Hu, C. Fowler*, and H. Zhang*, “Multifunctional Metasurface Design with a Generative Adversarial Network,” *Adv. Opt. Mater.* **9**, 2001433 (2021). [**Back cover**]
 37. M. A. A. Chazot*, C. Arias, **M. Kang**, C. Blanco, A. Kostogiannes, J. Cook, A. Yadav, V. Rodriguez, F. Adamietz, D. Verreault, S. Danto, T. Loretz, A. Seddon, D. Furniss, K. Schepler, M. C. Richardson, and K. Richardson, “Investigation of ZnSe dissolution in chalcogenide glasses as a route toward the realization of mid-wave infrared fiber laser,” *J. Non-Cryst. Solids* **555**, 120619 (2021).
 38. C. Rios*, Y. Zhang, M. Shalaginov, S. Deckoff-Jones, H. Wang, S. An, H. Zhang, **M. Kang**, K. A. Richardson, C. Roberts, J. Chou, V. Liberman, S. Vitale, J. Kong, T. Gu, and J. Hu*, “Multi-level Electro-thermal Switching of Optical Phase-Change Materials Using Graphene,” *Adv. Photon. Res.* **2**, 2000034 (2021).
 39. S. An, B. Zheng, M. Y. Shalaginov, H. Tang, H. Li, L. Zhou, J. Ding, A. M. Agarwal, C. Rivero-Baleine, **M. Kang**, K. A. Richardson, T. Gu, J. Hu, C. Fowler*, and H. Zhang*, “A Deep Learning Modeling Approach for Metasurfaces with High Degrees of Freedom,” *Opt. Express* **28**, 31932 (2020).
 40. A. Yadav*, **M. Kang**, C. Goncalves, C. Blanco, R. Sharma, and K. Richardson, “Impact of raw material surface oxide removal on dual band infrared optical properties of As₂Se₃ chalcogenide glass,” *Opt. Mater. Express* **10**, 2274 (2020).
 41. L. Karam, F. Adamietz, D. Michau, C. Goncalves, **M. Kang**, R. Sharma, G. S. Murugan, T.

- Cardinal, E. Fargin, V. Rodriguez, K. A. Richardson, and M. Dussauze*, “Electrically polarized amorphous sodo-niobate film competing with crystalline lithium niobite second order optical response,” *Adv. Opt. Mater.* **8**, 2000202 (2020).
42. K. Richardson*, **M. Kang***, L. Siskin, A. Yadav, S. Novak, A. Lepicard, I. Martin, H. Francois-Saint-Cyr, C. M. Schwarz, T. S. Mayer, C. Rivero-Baleine, A. J. Yee, and I. Mingareev, “Advances in infrared GRIN materials: a review,” *Opt. Eng.* **59**, 112602 (2020). [**∗**: Co-corresponding authors, Invited review article in a special topical issue entitled “Advances in Gradient Index Optics Technology”]
43. R. Sharma*, R. Welch, **M. Kang**, C. Goncalves, C. Blanco, A. Buff, V. Fauvel, T. Loretz, C. Rivero-Baleine, and K. A. Richardson, “Impact of morphology and microstructure on the mechanical properties of Ge-As-Pb-Se Glass Ceramics,” *Appl. Sci.* **10**, 2836 (2020). [Invited article in a special topical issue entitled “Photonic Glass-Ceramics: Fabrication, Properties and Applications”]
44. **M. Kang**, L. Siskin, C. Lonergan, A. Buff, A. Yadav, C. Goncalves, C. Blanco, P. Wachtel, J. D. Musgraves, A. V. Pogrebnnyakov, E. Baleine, C. Rivero-Baleine, T. S. Mayer, C. G. Pantano, and K. A. Richardson*, “Monolithic Chalcogenide Optical Nanocomposites Enable Infrared System Innovation: Gradient Refractive Index (GRIN) Optics,” *Adv. Opt. Mater.* **8**, 2000150 (2020). [**Front inside cover, Highlighted in Advanced Science News and a UCF CREOL Department News**]
45. B. Shen, H. Lin, S. S. Azadeh, J. Nojic, **M. Kang**, F. Merget, K. A. Richardson, J. Hu, and J. Witzens*, “Reconfigurable frequency-selective resonance splitting in chalcogenide microring resonators,” *ACS Photonics* **7**, 499 (2020).
46. I. Mingareev*, **M. Kang**, M. Truman, J. Qin, G. Yin, J. Hu, C. M. Schwarz, I. B. Murray, M. C. Richardson, and K. A. Richardson, “Spatial Tailoring of the Refractive Index in Infrared Glass-Ceramic Films Enabled by Direct Laser Writing,” *Opt. Laser Technol.* **126**, 106058 (2020).
47. C. M. Schwarz*, **M. Kang**, L. Siskin, Q. Altemose, K. Raichle, B. Schnable, C. Grabill, J. Rice, C. G. Pantano, I. Mingareev, C. Rivero-Baleine, K. Richardson, and S. M. Kuebler, “Fabrication and properties of ZnO-Bi₂O₃-B₂O₃ glass-ceramic containing Bi₂ZnB₂O₇ nanocrystals,” *J. Alloys Compd.* **820**, 153173 (2020).
48. J. R. Rodriguez, Z. Qi, H. Wang, M. Y. Shalaginov, C. Goncalves, **M. Kang**, K. A. Richardson, J. Guerrero, M. G. Moreno, and V. G. Pol*, “Ge₂Sb₂Se₅ Glass as High-Capacity Promising Lithium-ion Battery Anode,” *Nano Energy* **68**, 104326 (2020).
49. D. McGill*, J. B. Ghozi-Bouvrade, **M. Kang**, M. Dohlen, G. Delaizir, S. Chenu, L. Roumiguier, J. Duclere, K. Richardson, and R. M. Gaume, “Hot-Pressing of Tellurite Glass with a Sacrificial Pressure-Transmitting Medium,” *J. Non-Cryst. Solids* **528**, 119713 (2020).
50. **M. Kang** and R. S. Goldman*, “Ion-Irradiation of Compound Semiconductor Surfaces: from Self-Assembled Nanostructures to Plasmonic Crystals,” *Appl. Phys. Rev.* **6**, 041307 (2019). [**Invited review article in a special topical issue entitled “Ion beam enabled nanoscale fabrication, surface patterning, and self-assembly”, Editor’s pick**]
51. Y. Zhang[†], J. B. Chou^{†*}, J. Li[†], H. Li[†], Q. Du, A. Yadav, S. Zhou, M. Y. Shalaginov, Z. Fang, H. Zhong, C. Roberts, P. Robinson, B. Bohlin, C. Rios, H. Lin, **M. Kang**, T. Gu, J. Warner, V. Liberman, K. Richardson, and J. Hu*, “Broadband Transparent Optical Phase Change Materials for High-Performance Nonvolatile Photonics,” *Nat. Commun.* **10**, 4279 (2019). [[†]: Equal contribution]
52. L. Siskin[†], **M. Kang**[†], J. M. Veras, C. Smith, A. Buff, A. Yadav, D. McClane, C. Blanco, C.

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UNREFEREED ARTICLES

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CONFERENCE PROCEEDINGS

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3. F. Yang, H.-I. Lin, M. Y. Shalaginov, K. Stoll, S. An, C. Rivero-Baleine, **M. Kang**, A. Agarwal, K. Richardson, H. Zhang, J. Hu, and T. Gu*, "Non-mechanical reconfigurable zoom

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29. C. Schwarz*, **M. Kang**, C. Pantano, K. Richardson, C. Rivero-Baleine, S. Kuebler, C. Grabill, J. Rice, Q. Altemose, K. Raichle, B. Schnable, I. Wietecha-Reiman, and E. Haldeman, “Optical and crystal growth studies of ZnO-Bi₂O₃-B₂O₃ glass,” *Proc. SPIE* **10627**, 10627O (2018).
 30. K. Richardson*, A. Buff, C. Smith, L. Sissen, J. D. Musgraves, P. Wachtel, T. Mayer, A. Swisher, A. Pogrebnyakov, **M. Kang**, C. Pantano, D. Werner, A. Kirk, S. Aiken, and C. Rivero-Baleine, “Engineering novel infrared glass ceramics for advanced optical solutions,” *Proc. SPIE* **9822**, 982205 (2016).

BOOK CHAPTERS

1. K. Richardson^{†*} and **M. Kang**[†], “Chalcogenide Materials for Mid-Wave Infrared Fiber,” *Mid-infrared Fibre Photonics edited by S. Jackson, R. Vallee, and M. Bernier*, Elsevier (2021). *In press* [[†]: **Equal contribution**]
2. **M. Kang**^{†*} and K. Richardson[†], “Glasses: Chalcogenides,” *Encyclopedia of Materials: Technical Ceramics and Glasses edited by S. Hampshire*, Elsevier (2021). [[†]: **Equal contribution**]
3. I. Mingareev*, F. Weirauch, T. Bonhoff, N. Gehlich, **M. Kang**, K. Richardson, and M. Richardson, “Applications of high-power 2μm thulium fiber lasers in materials processing,” *Advances in High-Power Fiber and Diode Laser Engineering edited by I. Divliansky*, Institution of Engineering & Technology (2020).

PRESENTATIONS

1. “Photochemically-Programmable Optically-Functional High-Precision 3-D Chalcogenide Surface Glass Structures,” *MS&T25 Technical Meeting and Exhibition*, Columbus, OH, September 2025.
2. “Spatial Fidelity of Laser-Written Three-Dimensional Glass Structures and their Optical Functionalization,” *16ths Pacific Rim Conference on Ceramic and Glass Technology including Glass & Optical Materials Division Meeting (GOMD 2025)*, Vancouver, British Columbia, Canada, May 2025. [**Invited**]
3. “Self-Healing Semiconducting Chalcogenide Glasses Upon Gamma Irradiation,” *2025 Materials Research Society Spring Meeting*, Seattle, WA, April 2025.
4. “Novel Chalcogenide Glasses that can Curve Light, Self Heal, and Exhibit Permanent Stability,” *21st University Conference on Glass*, Alfred, NY, July 2024.
5. “Mechanisms behind the Structural Evolution of Ge-Sb-S Chalcogenide Glasses upon Gamma Irradiation,” *2024 Glass & Optical Materials Division Annual Meeting*, Las Vegas, NV, May 2024.
6. “Laser-Based Spatially-Tailorable Fabrication of Optically-Functional Three-Dimensional Chalcogenide Glass Structures,” *Pan American Ceramics Congress and Ferroelectrics Meeting of Americas (PACC-FMAs 2024)*, Panama City, Panama, April 2024. [**Invited**]
7. “Photochemically Engineered Large-Area Arsenic Sulfide Micro-Gratings for Hybrid Diffractive-Refractive Infrared Platforms,” *4th International Conference on Optics, Photonics and Lasers (OPL 2023)*, Hiroshima, Japan, December 2023.
8. “Irradiation as a Seemingly Destructive but Counterintuitively Constructive Process: The Case Study of Chalcogenides,” *Seminar in the Inamori School of Engineering at Alfred University*, Alfred, NY, July 2023. [**Invited**]

9. "Photochemically-Patterned Programmable Large-Area As₂S₃ Chalcogenide Metalayers for Hybrid Refractive-Diffractive Infrared Media", *American Ceramic Society: Glass and Optical Materials Division 2022 Annual Meeting*, Baltimore, MD, May 2022. **[Invited]**
10. "Novel, Scalable, and Energy-Efficient Approaches to the Fabrication and Characterization of Spatially-Tailorable Nanocomposites for Optical Platforms," *Seminar in the Inamori School of Engineering at Alfred University*, Alfred, NY, February 2022. **[Invited]**
11. "Unveiling True Three-Dimensional Microstructural Evolution in Chalcogenide Nanocomposites as a Route to Advanced Infrared Functionality," *14th Pacific Rim Conference on Ceramic and Glass Technology including Glass & Optical Materials Division 2021 Annual Virtual Meeting*, December 2021.
12. "Atomistic Origins behind the Temporal Optical Evolution of Ge-Sb-S Chalcogenide Glasses upon Gamma Irradiation for Use in Extreme Environment," *14th Pacific Rim Conference on Ceramic and Glass Technology including Glass & Optical Materials Division 2021 Annual Virtual Meeting*, December 2021.
13. "Atom Probe Tomography Brings Infrared Gradient Refractive Index Materials One Step Closer to Commercialization" *Virtual guest lecture in CAMECA's Webinars on the FUNDamentals of APT*, November 2021. **[Invited]**
14. "On the Atom Probe-Informed Rational Design of Monolithic Infrared Gradient Refractive Index Chalcogenide Nanocomposite Materials," *Atom Probe Tomography and Microscopy 2020 Virtual Meeting*, November 2020.
15. "Unveiling True Three-Dimensional Microstructural Evolution in Novel Chalcogenide Nanocomposites as a Route to Infrared Gradient Refractive Index Functionality," *Microscopy & Microanalysis 2019 Virtual Meeting*, August 2020.
16. "Photothermally-Induced Ge-As-Pb-Se Chalcogenide Glass-Ceramic Films with Infrared Function towards a Gradient Refractive Index Element" *25th International Congress on Glass*, Boston, MA, June 2019.
17. "Scalable Laser-Written Multicomponent Ge-As-Pb-Se Chalcogenide Glass-Ceramic Films with Mid-and Long-Wave Infrared Optical Function in a Gradient Refractive Index Element" *SPIE Defense+Commercial Sensing*, Baltimore, MD, April 2019.
18. "Refractive Index Patterning of Infrared Glass Ceramics through Laser-Induced Vitrification" *Materials Science & Technology*, Columbus, OH, October 2018. **[Invited, 2018 Karl Schwartzwalder-Professional Achievement in Ceramic Engineering Award Winner Presentation]**
19. "Ultra-low Dispersion Multicomponent Thin Film Chalcogenide Glass for Broadband Gradient Index Optics" *20th University Conference on Glass and Summer School*, University Park, PA, August 2018.
20. "Time-Dependent Microstructural and Optical Evolutions of Ge-Sb-S Chalcogenide Glasses upon Gamma Irradiation for Mid-Infrared Photonics Applications" *American Ceramic Society: Glass and Optical Materials Division Meeting*, San Antonio, TX, May 2018.
21. "Self-Organized Freestanding One-Dimensional Plasmonic Au Nanoparticle Arrays" *Materials Research Society Meeting*, Boston, MA, December 2017.
22. "Exploiting Defect Processes in Chalcogenide Glass Films for Gradient Index Optics Applications" *Materials Research Society Meeting*, Boston, MA, December 2017.
23. "Irradiation-Enabled, Energy-Efficient Fabrication of Next Generation Nanocomposites for Plasmonics and Transmissive Optics," *Seminar in CREOL, The College of Optics and Photonics at the University of Central Florida*, Orlando, FL, December 2016. **[Invited]**

24. "Novel Multicomponent Chalcogenide Glasses for Manufacturable Gradient Index Lenses," *Materials Research Society Meeting*, Boston, MA, December 2015.
25. "Optical Properties of Focused Ion Beam-Induced Plasmonic Ga Nanoparticle Arrays on Compound Semiconductor Surfaces," *American Physical Society March Meeting 2013*, Baltimore, ML, March 2013.
26. "Optical Properties of FIB-Fabricated Metallic Nanostructure Arrays on Compound Semiconductor Surfaces," *16th International Conference on Luminescence*, Ann Arbor, MI, June 2011.
27. "FIB-Assisted Molecular Beam Epitaxy and Optical Properties of Metal-Semiconductor Nanocomposites," *Materials Research Society Meeting*, Boston, MA, November 2010. **[Awarded best poster presentation]**
28. "FIB-Synthesized Surface Nanostructure Arrays for Negative Index Metamaterials," *37th Annual Spring Michigan Chapter of the AVS*, Ann Arbor, MI, May 2010.
29. "FIB-Synthesized Surface Nanostructure Arrays for Negative Index Metamaterials," *Materials Research Society Meeting*, San Francisco, CA, April 2010.
30. "Focused-Ion-Beam-Synthesis of Surface Nanostructure Arrays," *2010 International Winter School: Beyond Moore's Law*, Jeju Island, Korea, February 2010.
31. "Focused-Ion-Beam-Synthesis of Surface Nanostructure Arrays," *37th Conference on the Physics and Chemistry of Surfaces and Interfaces*, Santa Fe, NM, January 2010.
32. "FIB-Synthesized Ga Nanodroplet Arrays for Negative Index Metamaterials," *Materials Research Society Meeting*, Boston, MA, November 2009.
33. "FIB-Synthesized Nanostructure Arrays for Negative Index Metamaterials," *Electron Microscopy Analysis Laboratory 40th Year Anniversary Symposium at the University of Michigan*, Ann Arbor, MI, October 2009. **[Awarded best poster presentation]**
34. "Formation and Properties of Focused-Ion Beam Induced Nanostructures," *Electronic Materials Conference*, University Park, PA, June 2009.
35. "Formation of Nanostructure on Semiconductor Surfaces using Focused-Ion Beams," *36th Annual Spring Michigan Chapter of the AVS*, East Lansing, MI, May 2009.

PATENTS

1. C. Rivero-Baleine, **M. Kang**, G. Love, and K. A. Richardson, "Optical Aberration Compensation Lens Using Glass-Ceramics and Method of Making," USA 12393023 (August 19, 2025).
2. K. Schepler, K. Richardson, M. Richardson, C. Arias and **M. Kang**, "Optical Nanocomposites for Laser Applications," USA 11851368 (December 26, 2023).
3. B. Park, C. Kim, **M. Kang**, M. Kim, J. Park, H. Kim, and M. Kim, "Electrode Catalyst with Improved Longevity Properties and Fuel Cell Using the Same," Korea 10-0739307 (July 6, 2007), USA 8470495 (June 25, 2013), Taiwan I404258 (August 1, 2013), and Japan 5209474 (March 1, 2013).

PRESS RELEASES

1. "Alfred University student takes third place in Oldfield Award competition," AU News, September 2025
[<https://www.alfred.edu/about/news/pressreleases/2025/09/alfred-university-student-takes-third-place-in-oldfield-award-competition.cfm>]
1. "Alfred University students, professor collaborate on cover art for MRS Bulletin," Alfred University News, August 2025

- [<https://www.alfred.edu/about/news/pressreleases/2025/08/alfred-university-students-professor-collaborate-on-cover-art-for-mrs-bulletin.cfm>]
2. “*Self-healing chalcogenide glass?*,” Laser Focus World, October 2024
Article: [<https://www.laserfocusworld.com/optics/article/55238673/self-healing-chalcogenide-glass>]
Video: [<https://youtu.be/-NdOIgA7s6k?si=auItqwNgdMS7SR-U>]
 3. “*Alfred University awarded NSF grant for ellipsometry equipment acquisition*,” Alfred University News, August 2024
[<https://www.alfred.edu/about/news/pressreleases/2024/08/alfred-university-awarded-nsf-grant-for-ellipsometry-equipment-acquisition.cfm>]
 4. “*Alfred University student wins Young Scholars Award from ACerS*,” Alfred University News, July 2024
[<https://www.alfred.edu/about/news/pressreleases/2024/07/alfred-university-student-wins-young-scholars-award-from-acers.cfm>]
 5. “*Alfred University Professor Co-Authors Paper on Self-Healing Glass*,” Alfred University News, April 2024
[<https://www.alfred.edu/about/news/pressreleases/2024/04/alfred-university-professor-co-authors-paper-on-self-healing-glass.cfm>]
 6. “*UCF Researchers Help Discover Self-Healing Glass*,” UCF Today, July 2024
[<https://www.ucf.edu/news/ucf-researchers-help-discover-self-healing-glass/>]
 7. “*Novel infrared gradient refractive index materials*,” UCF CREOL News, July 2020
[<https://creol.ucf.edu/news/novel-infrared-gradient-refractive-index-materials/>]
 8. “*Monolithic Chalcogenide Optical Nanocomposites Enable Infrared System Innovation: Gradient Refractive Index Optics*,” Advanced Science News Twitter, March 2020
[<https://twitter.com/AdvSciNews/status/1244617985106620423?s=20>]
 9. “*Ultralow Dispersion Multicomponent Thin-Film Chalcogenide Glass for Broadband Gradient-Index Optics*,” UCF CREOL News, September 2018
[<https://creol.ucf.edu/news/ultralow-dispersion-multicomponent-thin-film-chalcogenide-glass-for-broadband-gradient-index-optics/>]
 10. “*Think Small*,” Tata in Europe Perspective Issue Six, Page 59, April 2018
 11. “*Nanoparticles could spur better LEDs, invisibility cloaks*,” Michigan News, July 2017
[ns.umich.edu/new/releases/24969-nanoparticles-could-spur-better-leds-invisibility-cloaks]

CONFERENCE SESSION CHAIRING

1. “Optical and Electronic Materials and Devices” *ACerS Spring Meeting 2026*, April 2026.
2. “Glass-based Optical Devices” *Glass & Optical Materials Division 2021 Annual Meeting (virtual)*, December 2021.

PROFESSIONAL MEMBERSHIP

The American Ceramics Society (ACerS): Glass & Optical Materials (GOMD), Electronics (EDiv), and Basic Science (BSD) divisions

SERVING AS A REFEREE FOR PAPERS

Reviewed 41 manuscripts submitted to peer-reviewed journals including:

Advanced Optical Materials, ACS Photonics, ACS Applied Nano Materials, Journal of Applied Physics, Optical Materials Express, Journal of the Optical Society of America B, Scientific Reports, Inorganic Chemistry, AIP Advances, Journal of Non-Crystalline Solids, Optical Materials, Applied Sciences, Optics Express, Applied Optics, and Journal of Electronic Materials.

TEACHING

1. **Ceramic Engineering Program, Alfred University**
Faculty Instructor (2026 Spring)
CEMS344 (Electrical, Magnetic, and Optical)
2. **Ceramic Engineering Program, Alfred University**
Faculty Instructor (2026 Spring, 2025 Spring)
CEMS545 (Characterization of Materials)

SUPERVISION

Thesis advisor:

1. Patrick E. Lynch (Undergraduate, Glass Engineering Science, AU): Oct 2023 – May 2025
2. Gil B. J. Sop Tagne (Undergraduate, Materials Science & Engineering, AU): Jan 2024 - Present
3. Lam Tran (Undergraduate, Glass Engineering Science, AU): May 2024 – Present
4. Zephyr G. Ramsey (Undergraduate, Glass Engineering Science, AU): Sep 2024 – Present

Thesis committee:

5. Amir Ashjari (Ph.D., Glass Engineering Science, AU): Oct 2023 – Present
6. Alicia T. Mayville (Ph.D., Glass Engineering Science, AU): Mar 2024 – Jul 2024
7. John T. Zaengle (Ph.D., Ceramic Engineering, AU): January 2025 – Present
8. Kathleen S. Matthies (Ph.D., Glass Engineering Science, AU): April 2024 – Present
9. Zixu Peng (Ph.D., Ceramic Engineering, AU): September 2025 – Present
10. Allena N. Rohde (Master, Materials Science & Engineering, AU): Nov 2024 – Present
11. Jiao Li (Ph.D., Ceramic Engineering, AU): Jan 2025 – July 2025
12. Anna Zachariou (Master, Optics & Photonics, UCF): Sep 2021 – May 2023
13. Quentin Altemose (Undergraduate, Physics, Ursinus College): May 2017 – July 2017