ASSEL AITKALIYEVA

CONTACT INFORMATION

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EDUCATION AND TRAINING

2013-2014	Idaho National Laboratory	Postdoctoral Fellow
2012	Texas A&M University	Ph.D. (Materials Science & Engineering)
2009	Texas A&M University	M.S. (Nuclear Engineering)
2006	Kazakh National University	B.S. (Physics)

PROFESSIONAL APPOINTMENTS

2022-present	Associate Professor, University of Florida
2017-2022	Assistant Professor, University of Florida
2014-2017	Staff Scientist, Idaho National Laboratory

HONORS AND AWARDS

2023 UF Materials Science and Engineering Departmental Faculty Excellence Award
Nominated by departmental faculty for service to the department.

2022 ANS Mary Jane Oestmann Women's Professional Achievement Award
For outstanding personal dedication and technical achievement for work performed in the fields of nuclear science, engineering, research, or education. Awarded by the American Nuclear Society (ANS).

2022 TMS Young Leaders Professional Development Award
Award to enhance the professional development of dynamic young people from TMS's five technical divisions. Awarded by The Minerals, Metals, and Materials Society (TMS).

2022 UF Herbert Wertheim College of Engineering Doctoral Dissertation Advisor Award
Recognizes excellence, innovation, and effectiveness in doctoral student advising and mentoring.

2022 UF Pramod P. Khargonekar Junior Faculty Award for Excellence
Awarded after the tenure process to the tenure candidate who best reflects the following leadership attributes exhibited by Dr. Khargonekar, former Dean of the College of Engineering: excellence in scholarship and teaching, outstanding mentorship of students, impact in their research field and exceptional potential for growth.

2022 UF Materials Science and Engineering Departmental Faculty Excellence Award
Nominated by departmental faculty for service to the department.

2019 ANS Nuclear Engineering Science Teaching Award

Recognizes a teacher of nuclear engineering and nuclear sciences, and the ability to impart knowledge and enthusiasm to students. Award issued by the ANS UF student chapter.

2019 Southeastern Conference Visiting Faculty Travel Program
Competitive travel program that aims to foster relationships that simulate collaborations between SEC member universities to exchange ideas, develop grant proposals, present lectures, and conduct research.

2018 DOE Early Career Award
DOE's most prestigious award in support of early career scientists from universities and national laboratories designed to bolster the nation's scientific workforce by providing support to exceptional researchers during crucial early career years.

2016 DOE Fuel Cycle Research and Development Excellence Award
Recognizes early to mid-career researchers supporting DOE's Fuel Cycle R&D program.

2015 INL Early Career Exceptional Achievement Award
Awards outstanding researchers early in their careers as they conduct nuclear technology research.

2013 INL Exceptional Scientific Contribution Award
Award to recognize exceptional scientific contribution in support of the mission of the laboratory.

PROFESSIONAL SERVICE

EXTERNAL

Leadership Positions in Professional Societies

TMS

2023-2026 SMD Council
2023-2026 Membership Diversity & Development Committee, SMD representative
2022-2023 Volunteer Training ad hoc committee
2022-2025 MiNES liaison, Nuclear Materials Committee representative
2019-2024 Executive Committee, Education

ANS

2023-2024 Chair, Materials Science and Technology Division
2022-2023 Vice Chair, Materials Science and Technology Division
2021-2022 Secretary/Treasurer, Materials Science and Technology Division
2018-2024 MSTD Executive Committee

MAS and MSA

2023-2025 Leader, Focused Ion Beam Focused Interest Group, MSA
2022-2024 Director, MAS
2020-2022 Leader-Elect, Focused Ion Beam Focused Interest Group, MSA
2016-2019 Editor, MicroNews, MAS

Conference Organization

2022-2025 Organizing committee, MiNES Conference
2019 Program co-chair, Microscopy and Microanalysis Conference

Symposium Organization

TMS Annual Meeting and Exhibit

2025 Elucidating Microstructural Evolution in Materials Under Extreme Environments
2025 Mechanical Behavior of Nuclear Reactor Components V
2025 Seaborg Institutes: Emerging Topics in Actinide Materials and Science
2024 Ceramics and Ceramic-based Composites for Nuclear Fission Applications
2024 Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories

2023 Seaborg Institutes: Emerging Topics in Actinide Materials and Science
2023 Mechanical Behavior of Nuclear Reactor Components IV
2021 Mechanical Behavior of Nuclear Reactor Components III
2020 Mechanical Behavior of Nuclear Reactor Components II
2019 Mechanical Behavior of Nuclear Reactor Components I

MS&T
2024 Processing-Microstructure-Property Relationships of Actinide Materials
2022 Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium
2021 Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium
2020 Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium
2019 Nanostructured Materials under Extreme Environments

10th Pacific Rim International Conference on Advanced Materials and Processing
2019 Renewable Energy Materials and Nuclear Materials

MiNES
2023 Fuels and Actinide Materials

M&M
2023 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications
2021 Evaluation of Materials for Nuclear Applications
2019 Microscopy and microanalysis of nuclear and irradiated materials
2017 Advances in FIB instrumentation and applications in materials and biological sciences

Society of Engineering Science
2017 Fracture, damage, and defect mechanics

American Nuclear Society
2024 Accelerating qualification of materials for nuclear environments - Panel

Professional Society membership
2022-present Asian Pacific Islander Working Group, DEI, TMS
2021-present Member, Diversity, Equity, and Inclusion Committee, TMS
2017-present Member, Nuclear Materials Committee, TMS
2017-present Member, Women in Nuclear
2017-present Member, Women in Nuclear US
2012-present Member, TMS
2011-present Member, Microscopy Society of America
2011-present Member, Microanalysis Society of America
2011-present Member, ANS

Editorial Board
2022-present Associate Editor, Frontier in Nuclear Engineering – Nuclear Materials

Manuscript Referee
Journal of Nuclear Materials; Scientific Reports; Journal of Applied Physics; Acta Materialia; Scripta Materialia; Journal of Materials Research; Micron; Computational Materials Science; Journal of

Materials Research; Nuclear Science and Engineering; Journal of Materials; Materials and Design; Materials Characterization; Nuclear Materials and Energy; Nuclear Instruments and Methods in Physics Research B; npj Materials Degradation; ACS Omega; Nuclear Technology; Journal of Alloys and Compounds.

Grant Proposal Referee

Dept. of Energy Nuclear Energy University Programs; Dept. of Energy Office of Basic Energy Sciences; National Science Foundation; Dept. of Energy Technology Commercialization Fund; Dept. of Energy Office of Small Business Innovation Research; Center for Integrated Nanotechnologies; Nuclear Science User Facilities; Natural Sciences and Engineering Research Council of Canada; Dept. of Energy Advanced Materials and Manufacturing Technologies—Building Technologies Office.

INTERNAL

University of Florida

2024-present	Faculty advisor, Women in Nuclear UF chapter
2023-2024	Chair, Nuclear Engineering Director and Professor Faculty Search Committee
2023-2024	Research Advancement Committee, HWCOE
2023-2024	Graduate Recruitment and Admissions Committee
2021-2023	Chair, Graduate Recruitment and Admissions Committee
2020-present	UMMP mentor
2017-present	NE Petitions Committee
2020-2021	NE Seminar Organizer
2017-2020	NE Faculty Search Committee
2017-2020	MSE Faculty Search Committee

PROFESSIONAL DEVELOPMENT

2022 **University of Florida Leadership Academy**
Gainesville, Florida
Highlights: Competitive 9-month program for emerging leaders who are interested in learning more about the University of Florida and navigating complex environments.

2017 **Emerging Leaders Alliance**
Falls Church, Virginia
Highlights: Leadership training to emerging leaders in several engineering associations including AIME, AIST, ASCE, NACE, NGWA, SME, SPE, and TMS. I was sponsored by TMS to attend.

MENTORSHIP AND SUPERVISION

Doctoral Dissertations Awarded

	Name	Graduation Date	Employment at the time of graduation
1.	Kory Burns	Summer 2022	Assistant Professor, University of Virginia
2.	Casey McKinney	Spring 2022	Postdoc, Oak Ridge National Laboratory
3.	Charlyne Smith	Summer 2021	Seaborg Fellow, Idaho National Laboratory
4.	Tanvi Ajantiwalay	Summer 2020	Staff, Pacific Northwest National Laboratory
5.	Riley Parrish	Summer 2019	Postdoc, Sandia National Laboratories

Doctoral Dissertations in Progress

	Name	Anticipated Graduation Date	Fellowships
1.	Aaron Rabin	Summer 2025	
2.	Brandon Bohanon	Summer 2026	
3.	Allison Probert	Summer 2026	UNLP
4.	Mitch Mika	Summer 2026	UNLP
5.	Mary Sevart	Summer 2028	NSF

6. Jack Mayer Summer 2028
7. Sadie Wicks Summer 2029
8. Bao-Phong Nguyen Summer 2029

Master's Non-Thesis Awarded

	Name	Graduation Date	Employment at the time of graduation
1.	Thaddeus Rahn	Summer 2022	Nuclear Power Plant
2.	Clay French	Summer 2021	Los Alamos National Laboratory
3.	Ana Baca	Summer 2020	Sandia National Laboratories
4.	Sarah Lantzy	Summer 2024	

Undergraduate Students

	Name	Dates	Scholarships/Fellowships
1.	Joel Solchenberger	2023-2024	
2.	Cade Finney	2022-2024	
3.	Nicolas Debesa	2022-2023	
4.	Layali Bazar	2022-2023	
5.	Talianna Ulloa	2020-2022	
6.	Matthew Frick	2022	
7.	Kaylee Cunningham	2021-2022	NSF Fellowship
8.	Hannah Baradon	2020	
9.	Nedgine Joseph	2020-2021	McNair scholar
10.	Peter Toma	2019	University Research Scholar
11.	Lauren Nagel	2019-2020	
12.	Horace Gordon	2019	
13.	Ashnee Patel	2018-2019	
14.	Stephon Dean	2018-2019	
15.	Carlos Casadeval	2018-20019	
16.	Ryan Finkelstein	2018-2019	
17.	Rayane Jallouli	2017	

FUNDED RESEARCH

University of Florida (2017-present) *$33.2M total; Aitkaliyeva Allocation: $5.4M*

1. Understanding Constituent Redistribution, Thermal Transport, and Fission Gas Behavior in U-Zr Annular Fuel Without a Sodium Bond; Source: DOE-NEUP; Role: Co-PI; Period of Performance: 2023-2026; Award Total: $1,000,000; Aitkaliyeva Allocation: $351,815.
2. Mechanisms of Irradiation-Induced Grain Subdivision; Source: DOE-BES; Role: Co-PI; Period of Performance: 2023-2026; Award Total: $799,792; Aitkaliyeva Allocation: $402,273.
3. Consortium for Nuclear Forensics; Source: NNSA; Role: Co-PI and Thrust Area Lead; Period of Performance: 2023-2028; Award Total: $25,000,000; Aitkaliyeva Allocation: $798,829.
4. Role of Heterogeneity in Manganese and Nickel Rich Precipitate Distribution on Hardening of Reactor Pressure Vessel Steels: Integrated Modeling and Experimental Characterization; Source: DOE-NEUP; Role: Co-PI; Period of Performance: 2022-2025; Award Total: $800,000; Aitkaliyeva Allocation: $284,720.
5. Science-Based Development of ASTM standard tests for graphite-based fuel pebbles; Source: DOE-NEUP, U. California-Berkeley subcontract; Role: Co-PI; Period of Performance: 2022-2025; Award Total: $700,000; Aitkaliyeva Allocation: $199,984.
6. High-fidelity modeling of fuel-to-coolant thermomechanical transport behaviors under transient conditions; Source: DOE-NEUP; Role: Co-PI; Period of Performance: 2021-2025; Award Total: $799,718; Aitkaliyeva Allocation: $199,984.

7. A novel framework for controlling strain in 2D/3D heterostructures; Source: UF Research; Role: PI; Period of Performance: 2021-2023; Award Total: $82,000; Aitkaliyeva Allocation: $82,000.
8. Thermal Conductivity Measurement of Irradiated Metallic Fuel Using TREAT; Source: DOE-NEUP, U. Pittsburgh subcontract; Role: Co-PI; Period of Performance: 2019-2025; Award Total: $500,000; Aitkaliyeva Allocation: $200,000.
9. Facilitating MARMOT Modeling of Radiation Phenomena in U-Pu-Zr fuels through experiments (MORPH experiment); Source: DOE-NE, NSUF-2; Role: PI; Period of Performance: 2018-2021; Award Total: $800,001; Aitkaliyeva Allocation: $800,001.
10. Establishing defect-property relationships in 2D materials; Source: DOE-BES; Role: PI; Period of Performance: 2018-2025; Award Total: $750,000; Aitkaliyeva Allocation: $750,000.
11. Expanding mechanical testing and characterization capabilities for irradiated materials research at University of Florida; Source: DOE-NEUP, GSI; Role: PI; Period of Performance: 2018-2019; Award Total: $249,473; Aitkaliyeva Allocation: N/A.
12. Bridging the length scales on mechanical property evaluation; Source: DOE-NE, U. California-Berkeley subcontract; Role: Co-PI; Period of Performance: 2018-2022; Award Total: $800,000; Aitkaliyeva Allocation: $256,000.
13. IASCC test facility for university of Florida nuclear fuels and structural materials research center; Source: DOE-NEUP, GSI; Role: Co-PI; Period of Performance: 2017-2018; Award Total: $246,379; Aitkaliyeva Allocation: N/A.
14. Joint appointment with Idaho National Laboratory; Source: INL; Role: PI; Period of Performance: 2017-2024; Award Total: $244,823; Aitkaliyeva Allocation: $244,823.
15. 3D characterization of nuclear fuels; Source: ORNL; Role: PI; Period of Performance: 2018-2022; Award Total: $207,644; Aitkaliyeva Allocation: $207,644.
16. Investigation of fission induced recrystallization in U-Mo fuels; Source: INL; Role: PI; Period of Performance: 2017-2024; Award Total: $311,547; Aitkaliyeva Allocation: $311,547.
17. Coupling of modeling and experiments to develop predictive models of the mechanical behavior of nuclear fuels and materials; Source: INL; Role: PI; Period of Performance: 2017-2018; Award Total: $68,808; Aitkaliyeva Allocation: $68,808.
18. Investigation of exciton delocalization and exciton coherence in chromophores and acoustic nanostructures; Source: INL; Role: PI; Period of Performance: 2017; Award Total: $10,000; Aitkaliyeva Allocation: $10,000.

Idaho National Laboratory (2013-2016) *$1.4M total; Aitkaliyeva Allocation: $1.4M*

1. Development of a synergistic approach to study irradiated materials using coupled experiments and simulation; Source: INL, LDRD; Role: PI; Period of Performance: 2015-2018; Award Total: $900,000; Aitkaliyeva Allocation: $900,000.
2. Nuclear fuels and materials characterization enhancement at Idaho National Laboratory; Source: DOE-NEUP, GSI; Role: PI; Period of Performance: 2014-2015; Award Total: $592,783; Aitkaliyeva Allocation: N/A.

User Facility Access Awards to Aitkaliyeva's group *Award Equivalent: ~$1.6M*

([G] denotes graduate students advised by Aitkaliyeva)

1. Characterization of Manganese-Nickel Rich Precipitates and Their Interaction with Dislocations in Irradiated Reactor Pressure Vessel Steels; Source: NSUF; Role: Co-PI; Main PI: B. Bohanon[G]; Award Number: 23-4747; Award Equivalent: $50,000.
2. Determining Mechanical Properties of the Phases Formed of Irradiated U-19Pu-10Zr fuels; Source: NSUF; Role: Co-PI; Main PI: M. Mika[G]; Award Number: 23-4751; Award Equivalent: $50,000.
3. Correlating microstructure to the thermal conductivity of irradiated U-20Pu-10Zr fuels; Source: NSUF; Role: Co-PI; Main PI: A. Probert[G]; Award Number: 23-4679; Award Equivalent: $50,000.
4. Compositional and Defect Analysis of the FCCI in high burnup UO_2; Source: NSUF; Role: Co-PI; Main PI: A. Probert[G]; Award Number: 23-1857; Award Equivalent: $50,000.

5. Assessment of Local Thermal Conductivity and Microstructure of Irradiated U-20 wt% Pu-10 wt% Zr alloy; Source: NSUF; Role: Co-PI; Main PI: C. Adkins; Award Number: 23-1898; Award Equivalent: $50,000.
6. An Assessment of Radial Compositional Variations of the Grey Phase in FBR MOX Fuel Using EPMA; Source: NSUF; Role: Co-PI; Main PI: C. McKinney[G]; Award Number: 22-4388; Award Equivalent: $50,000.
7. Assessing the Radial Thermal Conductivity Change in FBR MOX Fuel; Source: NSUF; Role: Co-PI; Main PI: C. McKinney[G]; Award Number: 21-4304; Award Equivalent: $50,000.
8. Photoemission electron microscopy of ion irradiated MoS_2; Source: CINT; Role: Co-PI; Main PI: K. Burns[G]; Award Number: 2021AU0036; Award Equivalent: $50,000.
9. Temperature-controlled vacancy channels in low-dimensional MoS_2; Source: CINT; Role: Co-PI; Main PI: K. Burns[G]; Award Number: 2021AU0061; Award Equivalent: $50,000.
10. Cryo-optical spectroscopy of gas-infused two-dimensional MoS_2; Source: 2DCC; Role: Co-PI; Main PI: K. Burns[G]; Award Number: MCV1-210527A-S0102; Award Equivalent: $50,000.
11. Light-tunable polaritons in CdS/CdSe core/shell quantum dots; Source: Molecular Foundry, LBNL
12. Role: Co-PI; Main PI: K. Burns[G]; Award Number: 7289; Award Equivalent: $50,000.
13. Cryo-optical spectroscopy of gas-infused two-dimensional MoS2; Source: CNMS; Role: Co-PI; Main PI: K. Burns[G]; Award Number: CNMS2021-A-00727; Award Equivalent: $50,000.
14. In-situ nano-tensile testing of neutron-irradiated HT-9 steel; Source: NSUF; Role: Co-PI; Main PI: T. Ajantiwalay[G]; Award Number: 20-4138; Award Equivalent: $50,000.
15. Identification of irradiation-induced phase evolution in Pu-Am-Zr fuels; Source: NSUF; Role: PI; Award Number: 20-4103; Award Equivalent: $50,000.
16. Atomic Scale Imaging of Two-dimensional Molybdenum Disulfide in Extreme Environments; Source: CNMS; Role: Co-PI; Main PI: K. Burns[G]; Award Number: CNMS2020-B-00403; Award Equivalent: $50,000.
17. The impact of grain orientation on the nucleation of fission gas bubbles in U-Mo fuel; Source: NSUF; Role: Co-PI; Main PI: C. Smith[G]; Award Number: 19-1806; Award Equivalent: $50,000.
18. In-situ nanomechanical characterization of neutron-irradiated HT-9 steel; Source: NSUF; Role: Co-PI; Main PI: T. Ajantiwalay[G]; Award Number: 19-1770; Award Equivalent: $50,000.
19. Low-Energy Ion Implantation of freestanding MoS2; Source: CINT; Role: Co-PI; Main PI: K. Burns[G]; Award Number: 2018BRA0016; Award Equivalent: $50,000.
20. 3D Microstructure Reconstruction of the Peripheral Region of MOX FBR Fuel; Source: NSUF; Role: Co-PI; Main PI: C. McKinney[G]; Award Number: 19-1649; Award Equivalent: $50,000.
21. Impact of grain boundary mobility on fission gas bubble distribution of ion-irradiated monolithic U-Mo fuel; Source: NSUF; Role: Co-PI; Main PI: C. Smith[G]; Award Number: 19-1649; Award Equivalent: $50,000.
22. Investigation of fuel-cladding chemical interaction (FCCI) in irradiated U-Pu-Zr fuel; Source: NSUF; Role: PI; Award Number: 18-1533; Award Equivalent: $50,000.
23. TEM Characterization of High Burnup MOX Fuel; Source: NSUF; Role: Co-PI; Main PI: R. Parrish[G]; Award Number: 18-1556; Award Equivalent: $50,000.
24. EPMA Characterization of Actinide Redistribution and Fission Product Composition in MOX Fuels; Source: NSUF; Role: Co-PI; Main PI: C. McKinney[G]; Award Number: 18-1484; Award Equivalent: $50,000.
25. TEM analysis of Irradiated MOX fuel; Source: NSUF; Role: Co-PI; Main PI: R. Parrish[G]; Award Number: 18-1370; Award Equivalent: $50,000.
26. Microstructural characterization of 7% burn-up MOX fuel; Source: NSUF; Role: Co-PI; Main PI: R. Parrish[G]; Award Number: 18-1179; Award Equivalent: $50,000.
27. Atom probe tomography of fission Gas bubble superlattice in U-Mo fuel; Source: NSUF; Role: Co-PI; Main PI: C. Smith[G]; Award Number: 18-1177; Award Equivalent: $50,000.
28. Microstructural characterization of 21% burn-up MOX fuel; Source: NSUF; Role: Co-PI; Main PI: R. Parrish[G]; Award Number: 17-1043; Award Equivalent: $50,000.

29. Microstructural characterization of 13% burn-up MOX fuel; Source: NSUF; Role: Co-PI; Main PI: R. Parrish[G]; Award Number: 17-1042; Award Equivalent: $50,000.
30. Pore-size distribution in U-Mo fuel irradiated to low burnup; Source: NSUF; Role: PI; Award Number: 17-1033; Award Equivalent: $50,000.
31. Atom probe tomography study of neutron irradiated U-Mo fuel; Source: NSUF; Role: Co-PI; Award Number: 17-952; Award Equivalent: $50,000.
32. Pore-size distribution in U-Mo fuel irradiated to high burnup; Source: NSUF; Role: Co-PI; Award Number: 17-917; Award Equivalent: $50,000.
33. Microstructural characterization of ~3% burn-up MOX fuel; Source: NSUF; Role: Co-PI; Main PI: R. Parrish[G]; Award Number: 17-909; Award Equivalent: $50,000.
34. Microstructural characterization of ~23% burn-up MOX fuel; Source: NSUF; Role: Co-PI; Main PI: R. Parrish[G]; Award Number: 17-812; Award Equivalent: $50,000.
35. APT of irradiated UO_2 fuel; Source: NSUF; Role: Co-PI; Award Equivalent: $50,000.
36. TEM microstructural characterization of irradiated UO_2 fuel; Source: NSUF; Role: Co-PI; Award Equivalent: $50,000.
37. Effects of carbon addition on the solute redistribution in Fe-9Cr alloys under irradiation; Source: NSUF; Role: Co-PI; Award Equivalent: $50,000.
38. Correlating mechanical properties and plastic deformation microstructure in irradiated steels; Source: NSUF; Role: PI; Award Equivalent: $50,000.
39. Atom probe tomography of Fe-U-Pu-Zr systems; Source: NSUF; Role: PI; Award Equivalent: $50,000.
40. Electron tomography of Fe-U-Pu-Zr systems; Source: NSUF; Role: PI; Award Equivalent: $50,000.
41. Atom probe tomography of intermetallic phases formed in Pu-bases diffusion couples; Source: NSUF; Role: PI; Award Equivalent: $50,000.
42. Characterization of as-cast microstructures in U-Pu-Zr and U-Pu-Mo alloys; Source: NSUF; Role: PI; Award Equivalent: $50,000.

PUBLICATIONS

Book Chapters

1. **A. Aitkaliyeva**, L. He, H. Wen, B. Miller, T. Allen, "Irradiation effects in generation IV nuclear reactor materials", in "Structural materials for generation IV nuclear reactor", edited by P. Yvon, Elsevier, 2017. http://dx.doi.org/10.1016/B978-0-08-100906-2.01001-6

Journal Publications

(Corresponding author is underlined, self is shown in bold, [G] denotes graduate and [U] undergraduate students)

1. M. Arivu, A. Hoffman, M. Bachhav, **A. Aitkaliyeva**, Y. Wu, B. Miller, D. Keiser, J. Gan, H. Wen, "Atom probe tomography of segregation at grain boundaries and gas bubbles in neutron irradiated U-10wt% Mo fuel", Materials Letters, 365, 136414 (2024). https://doi.org/10.1016/j.matlet.2024.136414
2. R. Kalia, N. Baradwaj, A. Aditya, A. Mishra, K. Burns[G], E. Lang, J. Hatchel, K. Hattar, **A. Aitkaliyeva**, A. Nakano, P. Vashishta, "Probing phonon focusing, thermomechanical behavior, and Moire patterns in van der Waals architectures using surface acoustic waves", npj Computational Materials, in press (2024).
3. K. Burns[G], K. Tadj, T. Allaparti, L. Arias, N. Li, **A. Aitkaliyeva**, A. Misra, M. Scott, K. Hattar, "Deep-learning enabled probing of irradiation-induced defects in time-series micrographs", APL Machine Learning, 2, 016117 (2024). https://doi.org/10.1063/5.0186046
4. M. Mika[G], N. Tomczak, C. Finney[U], J. Carter, **A. Aitkaliyeva**, "Automating SAED Phase Identification Using ML", J. Materiomics in press (2024) https://doi.org/10.1016/j.jmat.2023.12.010

5. K.M. Paaren, S. Christian, L. Capriotti, **A. Aitkaliyeva**, D. Porter, "Comparison of Zirconium Redistribution in BISON EBR-II models using FIPD and IMIS databases with experimental Post Irradiation Examination", Energies, 16 (19) 6817 (2023). https://doi.org/10.3390/en16196817
6. B. D. Miller, M. Bachhav, C. Smith[G], **A. Aitkaliyeva**, L. He, D.D. Keiser, J.W. Madden, A.B. Robinson, J. Gan, "Evidence of Xe-incorporation in the Bubble Superlattice in Irradiated U-Mo Fuel", Journal of Nuclear Materials, 587 154743 (2023) https://doi.org/10.1016/j.jnucmat.2023.154743
7. K. Burns[G], J. Hachtel, A. Aditya, N. Baradwaj, A. Mishra, A. Nakano, R. Kalia, E. Lang, R. Schoell, K. Hattar, **A. Aitkaliyeva**, "Tailoring the Angular Mismatch in MoS_2 Homobilayers through Deformation Fields", Small 19, 2300098 (2023) https://doi.org/10.1002/smll.202300098
8. S.E. Prameela, T.M. Pollock, D. Raabe, M.C. Meyers, **A. Aitkaliyeva**, K.-L. Chintersingh, Z.C. Cordero, L. Graham-Brady, "Materials for extreme environments", Nature Reviews Materials, 8 81-88 (2023) https://doi.org/10.1038/s41578-022-00496-z
9. T. Rahn[G], B. D. Miller, L. Capriotti, **A. Aitkaliyeva**, "Revising constituent redistribution model for U-Pu-Zr fuels with new TEM data", MRS Bulletin, Impact Article 48, 1-10 (2023) https://doi.org/10.1557/s43577-022-00422-2
10. C.M. Barr, E. Lang. K. Burns[G], P. Price, B.D. Miller, D.D. Keiser, **A. Aitkaliyeva**, K. Hattar, "The complex structural and chemical nature of monolithic U-10Mo fuel and Zr barrier layer", Journal of Nuclear Materials 573, 154083 (2023) https://doi.org/10.1016/j.jnucmat.2022.154083
11. C. McKinney[G], Floyd Hilty, D. Murray, N. Poudel, F. Cappia, T. Pavlov, **A. Aitkaliyeva**, "Three-dimensional microstructural characterization of FBR MOX fuel and the contribution of microstructural features to the thermal conductivity of the fuel", Journal of Nuclear Materials 572, 154073 (2022). https://doi.org/10.1016/j.jnucmat.2022.154073
12. E. Lang, K. Burns[G], Y. Wang, P. Kotula, A.B. Kustas, S. Rodriguez, **A. Aitkaliyeva**, K. Hattar, "Compositional effects of additively manufactured refractory high-entropy alloys under high energy helium irradiation", Nanomaterials 12(12), 2014 (2022). https://doi.org/10.3390/nano12122014
13. C. McKinney[G], C. Smith[G], G. Helmreich, T. Gerczak, **A. Aitkaliyeva**, "A practical guide to characterizing irradiated nuclear fuels using FIB tomography", Micron 158, 103290 (2022). https://doi.org/10.1016/j.micron.2022.103290
14. C. Smith[G], S. Biswas, B.D. Miller, B. Koombaiah, D. Fraser, D.D. Keiser, **A. Aitkaliyeva**, "Investigation of high burnup structure formation in U-Mo fuels", Journal of Nuclear Materials 563, 153617 (2022). https://doi.org/10.1016/j.jnucmat.2022.153617
15. **A. Aitkaliyeva**, "Recent trends in metallic fast reactor fuels research", Rising Stars issue of the Journal of Nuclear Materials, 558, 153377 (2022) https://doi.org/10.1016/j.jnucmat.2021.153377.
16. K. Burns[G], B. Bischoff, C.M. Barr, K. Hattar, **A. Aitkaliyeva**, "Photoexfoliation of MoS_2 Quantum Dots from Nanosheets: An In-Situ Transmission Electron Microscopy Study", Nanotechnology 33, 085601 (2021). https://doi.org/10.1088/1361-6528/ac357c
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Technical Reports

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2. J. Carmack, L. Braase, C. Papesch, D. Hurley, Y. Zhang, K. Gofryk, J. Harp, X. Bai, B. Miller, **A. Aitkaliyeva**, J. King, R. Hoggan, A. Wagner, K. Richardson, S. Middlemas, J. Lian, "FY2016 PEMP 1.1A Summary Report-Demonstrate high spatial resolution measurements at the microstructural level on as-fabricated nuclear fuels and materials", INL/EXT-16-39606, Idaho National Laboratory (2016).

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Miscellaneous

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2. **A. Aitkaliyeva**, S. Gupta, "Transitioning from an In-Person to Online Format Amidst the COVID-19 Pandemic as Discussed at the Judson Symposium", JOM 73, 490–491 (2021). https://doi.org/10.1007/s11837-020-04542-5
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PRESENTATIONS

Invited

(Presenting author is underlined, self is shown in bold, and ^{G} denotes graduate student, ^{A} alumni)

Self

1. A. Rabin^{G}, K. Burns^{G}, Z. Hu, L. Shao, K. Hattar, **A. Aitkaliyeva**, "Stability and behavior of MoS_2 in extreme radiation environments", TMS 2023, San Diego, CA, March 19-23, 2023.
2. **A. Aitkaliyeva,** invited panelist in "Early Career Development in Nuclear Materials - Panel", MiNES 2021, Pittsburgh, PA, November 8-12, 2021.
3. **A. Aitkaliyeva,** "TEM characterization of the microstructure of irradiated U-Pu-Zr fuels", M&M 2020, Milwaukee, WI, August 2-6, 2020.
4. **A. Aitkaliyeva,** "Microstructural characterization of metallic fuel alloys", MiNES 2019, Baltimore, MD, October 6-10, 2019.
5. **A. Aitkaliyeva,** invited panelist in ANS session for junior faculty development, ANS Winter Meeting and Exhibit, Orlando, FL, November 14, 2018.
6. **A. Aitkaliyeva,** "Microscopy and microanalysis of nuclear fuels", Presented at 2018 MS&T, Columbus, OH, October 14-18, 2018.
7. **A. Aitkaliyeva,** "Microstructural characterization of Pu-based fuels", Presented at 2018 Plutonium Futures-The Science 2018, San Diego, CA, September 9-14, 2018.
8. **A. Aitkaliyeva,** "Microscopy and microanalysis of nuclear fuels", Presented at 2018 MRS Spring Meeting & Exhibit, Phoenix, AZ, April 2-6, 2018.
9. **A. Aitkaliyeva,** "Coupled experimental and simulation approach to study transmutation fuels", Presented at 2017 MS&T meeting, Pittsburgh, PA, October 8-12, 2017.
10. **A. Aitkaliyeva,** "Microstructural evolution in metallic fuels", Presented at 2016 ANS Winter Meeting and Nuclear Technology Expo, Las Vegas, NV, November 6-10, 2016.
11. **A. Aitkaliyeva**, C. A. Papesch, Y. Wu, H. Wen, "The role of electron and atom probe tomography in characterization of nuclear fuels", Presented at ANS Nuclear Fuels and Structural Materials (NFSM-2016), New Orleans, LA, June 12-16, 2016.
12. **A. Aitkaliyeva**, "Electron and atom probe tomography of fresh transuranic fuels and irradiated fuels", Presented at Advances in Structural and Chemical Imaging (ASCI) symposium, Boise, ID, May 18-20, 2016.

13. **A. Aitkaliyeva**, "The role of the state-of-the-art equipment in advancement of nuclear energy research", Presented at Electron Microscopy for Biological, Environmental, and Energy Research (EMBEER), Richland, WA, July 28-30, 2015.

Students and collaborators

14. N. Senanayake, T. Rahn[G], N. Tomczak, **A. Aitkaliyeva**, J. Carter, "Machine Learning Algorithms for High-throughput Characterization of Structure and Microstructure of Metals for Extreme Environments", MS&T 2022, Pittsburgh, PA, October 9-12, 2022.
15. K. Burns[G], P.C. Reuel, F. Guerrero, E. Lang, P. Lu, **A. Aitkaliyeva**, K. Hattar, T.J. Boyle. "Thermal Stability and Radiation Tolerance of Lanthanide-Doped Cerium Oxide Nanocubes", 5th International Conference on Biomaterials and Nanomaterials. Edinburgh, Scotland, March 7-8, 2022.
16. C. Smith[G], B. Miller, S. Biswas, B. Kombaiah, D. Frazier, D. Keiser, **A. Aitkaliyeva**, "Formation of HBS in metallic U-Mo fuels", M&M 2021, Pittsburgh, PA, August 1-5, 2021.
17. C. McKinney[G], **A. Aitkaliyeva**, "Three-Dimensional Characterization of Oxide Fuel Utilizing Focused Ion Beam Tomography", M&M 2021, Pittsburgh, PA, August 1-5, 2021.
18. L. Shao, **A. Aitkaliyeva**, "Radiation effects on thermal conductivity of carbon buckypapers", Presented at the 5th International Meeting on Recent Developments in the Study of Radiation Effects in Matter, Kona, HI, July 2-6, 2012.

Contributed

Self

19. **A. Aitkaliyeva**, M. Mika[G], A. Probert[G], M. Sevart[G], T. Yao, E. Hisle, T. Pavlov, C. Adkins, K. Wright, L. Capriotti, "Correlating microstructure and properties of irradiated U-Pu-Zr fuels", 2024 NuMat, Singapore, October 14-17.
20. **A. Aitkaliyeva**, M. Mika[G], "Evaluating the strength of TRISO pebbles via drop tests and nondestructive techniques", TMS Annual Meeting & Exhibition 2024, Orlando, FL, March 3-7.
21. **A. Aitkaliyeva**, M. Mika[G], M. Sevart[G], F. Xu, T. Yao, L. Capriotti, "Correlating constituent redistribution and fission gas bubble structures in irradiated U-Zr fuels", "MiNES 2023, New Orleans, LA, December 10-14, 2023.
22. **A. Aitkaliyeva**, T. Rahn[G], K. Wright, L. Capriotti, "Constituent Redistribution in U-Pu-Zr Fuels and Its Dependence on Zr Content", MRS Spring Meeting and Exhibit 2022, Honolulu, HI, May 8-13, 2022.
23. **A. Aitkaliyeva**, T. Rahn[G], K. Wright, L. Capriotti, "On the phases observed in irradiated U-19Pu-14Zr fuels", TMS Annual Meeting & Exhibition 2022, Anaheim, CA, February 27-March 3, 2022.
24. **A. Aitkaliyeva**, T. Rahn[G], L. Capriotti, "Identifying crystalline phases in irradiated U-Pu-Zr fuels using TEM", MiNES 2021, Pittsburgh, PA, September 19-23, 2021.
25. **A. Aitkaliyeva**, L. Shao, L. Price, J. Gigax, H. Kim, D. A. Lucca, A. Zare, E. G. Fu, G. Xie, "Ordered nanocrystal formation in metallic glass Cu50Zr45Ti5 induced by focused ion beam", IBMM conference, San Antonio, TX, June 24-29, 2018.
26. **A. Aitkaliyeva**, C. A. Papesch, "Microstructural characterization of plutonium-based fuel", TMS Annual Meeting & Exhibition, Phoenix, AZ, March 11-15, 2018.
27. **A. Aitkaliyeva,** C. A. Papesch, "Microstructural characterization of Pu-Zr fuels", M&M 2017 Conference, St. Louis, MO, August 6-10, 2017.
28. **A. Aitkaliyeva,** C. A. Papesch, "The characterization of microstructure and chemistry of transmutation fuels", ANS Annual Meeting, San Francisco, CA, June 11-15, 2017.
29. **A. Aitkaliyeva,** C. A. Papesch, M. Tonks, "Coupling experiments and simulations to understand metallic fuel behavior", ANS Annual Meeting, San Francisco, CA, June 11-15, 2017.
30. **A. Aitkaliyeva,** C. A. Papesch, "Microstructural characterization and thermal properties of metallic Pu-Zr systems", TMS Annual Meeting & Exhibition, San Diego, CA, February 26-March 2, 2017.

31. **A. Aitkaliyeva,** C. A. Papesch, "Microstructural characterization of metallic transmutation fuels", 14th International Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation (14IEMPT), San Diego, CA, October 17-20, 2016.
32. **A. Aitkaliyeva,** J. W. Madden, C. A. Papesch, "TEM identification of phases in metallic Pu-based fuels", M&M, Columbus, OH, July 24-28, 2016.
33. **A. Aitkaliyeva,** J. W. Madden, C. A. Papesch, "TEM investigation of phases formed in ternary U-Pu-Zr systems", TMS Annual Meeting & Exhibition, Nashville, TN, February 14-18, 2016.
34. **A. Aitkaliyeva,** C. A. Papesch, "Microstructural characterization of metallic transmutation fuels", 14th International Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation (14IEMPT), San Diego, CA, October 17-20, 2016.
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37. **A. Aitkaliyeva**, J. W. Madden, B. D. Miller, J. I. Cole, J. Gan, B. Van Leer, "Effects of radiation and contamination on focused ion beam (FIB) system components", HOTLABS Conference, Leuven, Belgium, September 27-October 1, 2015.
38. **A. Aitkaliyeva**, J. W. Madden, B. D. Miller, J. I. Cole, J. Gan, "Sample preparation artifacts in nuclear materials and mitigation strategies", M&M, Portland, OR, August 2-6, 2015.
39. **A. Aitkaliyeva**, B. Miller, J. Madden, C. Papesch, "Fuel-cladding chemical interaction effects in U, Pu-based fuels and cladding", TMS Annual Meeting & Exhibition, Orlando, FL, March 15-19, 2015.
40. **A. Aitkaliyeva**, J. W. Madden, B. D. Miller, J. I. Cole, J. Gan, "TEM sample preparation techniques and associated artifacts in nuclear materials", MRS Fall Meeting & Exhibit, Boston, MA, November 30-December 5, 2014.
41. **A. Aitkaliyeva**, B. Miller, J. W. Madden, C. A. Papesch, "Characterization of intermetallic phases formed in U, Pu-bearing diffusion couples", MRS Fall Meeting & Exhibit, Boston, MA, November 30-December 5, 2014.
42. **A. Aitkaliyeva**, J. W. Madden, J. R. Kennedy, J. I. Cole, "Interaction of metallic nuclear fuel with Fe-based cladding", NuMat, Clearwater Beach, FL, October 27-30, 2014.
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Students and collaborators

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53. M. Mika[G], **A. Aitkaliyeva**, "Historical, contemporary, and future perspectives on fuel qualification", 2024 ANS Annual Conference, Las Vegas, NV, June 9-12.
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66. M. Mika[G], **A. Aitkaliyeva**, "Automating Selective Area Electron Diffraction Pattern Phase Identification Using Image Analysis and Machine Learning", TMS Annual Meeting & Exhibition 2023, San Diego, CA, March 19-23, 2023.
67. B. Bohanon[G], **A. Aitkaliyeva**, "Microstructural and Micromechanical Analysis of Steels After Neutron Irradiation", TMS Annual Meeting & Exhibition 2023, San Diego, CA, March 19-23, 2023.

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75. K. Wright, T. Rahn[G], L. Capriotti, **A. Aitkaliyeva**, "Electron Probe Microanalysis of Fuel from EBR-II Experiment X441A: Effects of Varying U: Pu: Zr Elemental Ratios", MiNES 2021, Pittsburgh, PA, September 19-23, 2021.
76. C. McKinney[G], **A. Aitkaliyeva**, "Three-Dimensional Characterization of Microstructural Features in Oxide Fuels", MiNES 2021, Pittsburgh, PA, September 19-23, 2021.
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78. T. Ajantiwalay[G], **A. Aitkaliyeva**, M. Dubey, Y. Wu, "In-situ nanomechanical characterization of neutron-irradiated HT-9 steel", MiNES 2021, Pittsburgh, PA, September 19-23, 2021.
79. C. McKinney[G], **A. Aitkaliyeva**, "Comprehensive 3D Microstructural Characterization of Nuclear Fuel", 3DMS 2021 Virtual, July 29 – August 2, 2021.
80. K. Burns[G], **A. Aitkaliyeva**, "Mitigating the substrate effect on two-dimensional molybdenum disulfide", MRS Spring Meeting and Exhibit, Virtual, April 17-23, 2021.
81. T. Ajantiwalay[G], S. Maloy, K. Hattar, **A. Aitkaliyeva**, "In-situ Micro-tensile Testing of Proton-irradiated HT-9 Steels", TMS virtual conference, March 15-18, 2021.
82. C. McKinney[G], **A. Aitkaliyeva**, "Three-dimensional microstructure characterization of oxide fuel", NuMat, virtual conference, October 26-30th, 2020.
83. T. Ajantiwalay[G], **A. Aitkaliyeva**, "In-situ micro-tensile testing of proton-irradiated 304 austenitic stainless steels" NuMat, virtual conference, October 26-30th, 2020.
84. C. Smith[G], Y. Cui, B. Miller, D. Keiser, A. Zare, and **A. Aitkaliyeva**, "An investigation of the degree of fission gas pores interconnectivity in U-Mo fuels", NuMaT 2020, Ghent, Belgium, Oct. 26-30, 2020.
85. P. Hosemann, H. Vo, A. Dong, S.A. Malloy, L. Capolungo, **A. Aitkaliyeva**, "Mechanical property evaluation of ion beam irradiated materials", 14th International Topical Meeting on Nuclear Applications of Accelerators, Vienna, Austria, April 5-9, 2020.
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87. K. Burns[G], A. M. Z. Tan, L. Shao, R. Hennig, **A. Aitkaliyeva**, "Optical phenomena of irradiation induced molybdenum disulfide", APS Meeting, Denver, CO, March 2-6, 2020.

88. K. Burns[G], **A. Aitkaliyeva**, "In-situ analysis of IR laser radiation damage on nano-structured MoS_2", TMS Annual Meeting & Exhibition, San Diego, CA, Feb 23-27, 2020.
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91. M. Tonks, J. Hirschhorn, **A. Aitkaliyeva**, and C. Adkins, "Analyzing U-Zr experimental data using quantitative phase-field simulation and sensitivity analysis", TMS Annual Meeting & Exhibition, San Diego, CA, Feb 23-27, 2020.
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94. L. Nagel[G], T. Ajantiwalay[G], **A. Aitkaliyeva**, "Comparison of in-situ and ex-situ meso scale tensile testing for the evaluation of Mechanical Properties of HT9 cladding", ANS Annual Meeting and Expo, Washington, DC, November 17-21, 2019.
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102. T. Ajantiwalay[G], **A. Aitkaliyeva**, C. Sun "Correlating small scale mechanical properties and microstructure of U-10wt%Mo/Zr fuels", TMS Annual Meeting & Exhibition, San Antonio, TX, March 10-14, 2019.
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