# Lane B. Carasik, Ph.D.

Department of Mechanical and Nuclear EngineeringEmail: lbcarasik@vcu.eduVirginia Commonwealth UniversityEmail: lane.carasik@gmail.com401 West Main St. Room E2238Homepage: ResearchGateP.O. Box 843015Orcid ID: 0000-0002-4235-4697Richmond, VA 23284Orcid ID: 0000-0002-4235-4697

## Education

Doctor of Philosophy, Nuclear Engineering	2017
Texas A&M University	
• Thesis Title: Investigation of Solution Verification and Validation of Nuclear Thermal Computational Fluid Dynamics using Twin Rectangular Turbulent Jets	Hydraulics
Bachelors of Science, Nuclear Engineering	2012
University of Tennessee, Knoxville	
Associates of Science, Mathematics	2010
Middle Georgia State University	

## Areas of Specialization

Advanced Fission & Fusion Reactor Design, Additive Manufacturing, Fundamental Fluid Dynamics and Heat Transfer, Computational Fluid Dynamics

## **Professional Appointments**

### Assistant Professor

Virginia Commonwealth University, Richmond, VA – Department of Mechanical and Nuclear Engineering Duties:

- Coordinate research activities and mentor graduate and undergraduate students
- Develop and teach coursework for undergraduate and graduate students

### Director

Virginia Commonwealth University, Richmond, VA – Fluids in Advanced Systems and Technology (FAST) Research Group

Duties:

• Coordinate and conduct research activities for thermal-fluids investigations of advanced energy systems

## Director

Virginia Commonwealth University, Richmond, VA – High Performance Research Computing Core Facility

Duties:

• Part-time administrative role providing strategic direction and management of four staff members

### August 2019 – Present

January 2021 – June 2021

August 2019 – Present

#### Lane B. Carasik, Ph.D.

#### **Nuclear Thermal Fluids Engineer**

Ultra Safe Nuclear Corporation, Seattle, WA – Advanced Projects Division Duties:

• Assist in the development of TRICORDER, a system code for the design and analysis of Nuclear Thermal Propulsion systems for space exploration missions

• Provide thermal fluid design support across multiple projects

#### CFD & Thermal Fluids Engineer

Kairos Power LLC., Oakland, CA – Testing Program Duties:

- Conduct CFD analysis to support the Kairos Power Fluoride-salt-cooled High Temperature Reactor design and testing program
- Coordinate and conduct CFD analysis for the GAIN NEAMS Thermal-Fluids Test Stand voucher

#### **Graduate Research Assistant**

Texas A&M University, College Station, TX – Thermal-Hydraulic Research Group Research Supervisor: Y. A. Hassan

Projects:

- Buoyancy Influenced Flows and Thermal Stratification in Nuclear Reactor Systems
- Molten Salt Flows in Cross-flow Heat Exchangers for Small Modular Reactors
- Studies of Twin Jets for CFD Verification and Validation Studies

#### **Undergraduate Research Assistant**

University of Tennessee, Knoxville, TN – Thermal Fluids Group Research Supervisor: A. E. Ruggles

Projects:

- Experimental Study of Thermal Stratification in Large Enclosures
- Experimental Study of Twin Jets for Validation and Verification Studies

## Peer-Reviewed Journal Articles

- 1. Cody Wiggins, L. B. Carasik, A. Ruggles, "Noninvasive Interrogation of Local Flow Phenomena in Twisted Tape Swirled Flow Via Positron Emission Particle Tracking (PEPT).", Nuclear Engineering and Design, vol. 387, pp. 111601, 2022. 10.1016/j.nucengdes.2021.111601
- 2. C.R.K. Windows-Yule, M.T. Herald, A.L. Nicusan, C.S. Wiggins, G. Pratx, S. Manger, A.E. Odo, T. Leadbeater, J. Pellico, R.T.M. de Rosales, A. Renaud, I. Govender, L.B. Carasik, A.E. Ruggles, Tz. Kokalova-Wheldon, J.P.K. Seville, D.J. Parker "Recent Advances in Positron Emission Particle Tracking: A Comparative Review and Benchmarking.", Reports on Progress in Physics, vol. 85(1), 2022. 10.1088/1361-6633/ac3c4c
- 3. A. Cabral, C. S. Wiggins, L. B. Carasik, J. Fishler "Identification of Surrogate Fluids for Molten Salt Coolants used in Energy Systems Applications including Concentrated Solar and Nuclear Power Plants.", International Journal of Energy Research, vol. 46(3), pp.3554-3571, 2022. 10.1002/er.7405
- 4. C. S. Wiggins, A. Cabral, L. B. Carasik "Heat Transfer Performance of Cu-Cr-Zr Tube with Swirl Insert Under Cyclic Thermal Loading in Monoblock Divertor.", Fusion Science and Technology, vol. 77(7-8), pp. 710-715, 2021.: 10.1080/15361055.2021.1898304
- 5. C. S. Wiggins, A. Cabral, L. B. Carasik "Investigation of Pressure Drop Calculation for Twisted Tape Swirl Tubes by Conventional Channel Flow Correlations with Fusion Applications.", Fusion

August 2013 – May 2017

June 2017 – July 2018

August 2018 – June 2019

September 2010 – December 2012

Science and Technology, vol. 77(3), pp. 206-219, 2021. DOI: 10.1080/15361055.2021.1872273

- D. R. Shaver, L. B. Carasik, E. Merzari, N. Salpeter, E. Blandford "Calculation of friction factors and Nusselt numbers for twisted elliptical tube heat exchangers using Nek5000." ASME Journal of Fluids Engineering, vol. 141(7), pp. 071205-071205-11, 2019. 10.1115/1.4042889
- L. B. Carasik, H. Wang, Y. A. Hassan "Simulations of Twin Turbulent Planar-Like Jets Injected into a Large Volume using RANS," ASME Journal of Fluids Engineering, vol. 140(12), pp. 121108-121108-12, 2018. 10.1115/1.4040231
- L. B. Carasik, D. R Shaver, J. B. Haefner, Y. A. Hassan "Steady RANS Methodology for Calculating Pressure Drops of In-Line Molten Salt Compact Heat Exchangers," Progress in Nuclear Energy, vol. 101, pp. 209-223, 2017. 10.1016/j.pnucene.2017.07.017
- L. M. Brockmeyer, L. B. Carasik, E. Merzari, Y. A. Hassan "Numerical Simulations for Determination of Minimum Representative Bundle Size in Wire Wrapped Tube Bundles," Nuclear Engineering and Design, vol. 322, pp. 577-590, 2017. 10.1016/j.nucengdes.2017.06.038
- L. B. Carasik, F. Sebilleau, S. P. Walker, Y. A. Hassan "Numerical Simulations Of A Mixed Momentum-Driven And Buoyancy-Driven Jet In A Large Enclosure For Nuclear Reactor Severe Accident Analysis," Nuclear Engineering and Design, vol. 312, pp. 161-171, 2017. 10.1016/j.nucengdes.2016.10.053

## Submitted Journal Manuscripts

11. W. Sames, L.B. Carasik, C. Soderhjelm, B.Taljat "Conformal Cooling Review: Thermal, Mechanical, and Hydraulic Principles of Mold and Die Cooling Channel Design.", (2021)

## **Refereed Conference Proceedings**

- Cody Wiggins, Arturo Cabral, L. B. Carasik, "Wiggins 2022 Coregistered Positron Emission Particle Tracking (PEPT) and X-ray Computed Tomography (CT) for Engineering Flow Measurements." The 19<sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-19), Brussels, Belgium (March 2022)
- Cody Wiggins, L. B. Carasik, "Performance Qualification Measurements using new PEPT Facility for Pebble Bed Reactor Research." Transactions of the American Nuclear Society (Vol. 125(1), pp. 1162-1165). Washington D.C. (2021)
- Arturo Cabral, Darius D. Lisowski, L. B. Carasik, "Novel Distributed Flow Velocity Using a Temperature Fiber Optic in Gas Flow." Transactions of the American Nuclear Society (Vol. 125(1), pp. 1234-1237). Washington D.C. (2021)
- Cody Wiggins, L. B. Carasik, "Design of Experimental Facility for Noninvasive Measurement of Flow in HTGR Primary Components." Transactions of the American Nuclear Society (Vol. 124(1), pp. 774-776). Virtual Meeting (2021)
- Arturo Cabral, Cody S. Wiggins, Meryem E. Murphy, Ryan P. McGuire, Candler L. L. Langston, L. B. Carasik, "Preliminary Measurements of Swirl Flow Heat Transfer Enhancements for Reactor Heat Exchanger Technologies." Transactions of the American Nuclear Society (Vol. 123(1), pp. 1535-1538). Virtual Meeting (2020)
- S. Tutwiler, L. B. Carasik, "Generalized Python Tool for Thermal Hydraulics Core Analysis of Advanced Reactors." Transactions of the American Nuclear Society (Vol. 123(1), pp. 1109-1112). Virtual Meeting (2020)
- Amir Ali, L. B. Carasik, Arturo Cabral, "Towards Understanding the Thermal-Hydraulic Distortion of using Surrogate Fluids for FHRs Development." Transactions of the American Nuclear Society (Vol. 123(1), pp. 1779-1782). Virtual Meeting (2020)

- Cody Wiggins, L. B. Carasik, A. Ruggles, "Noninvasive Interrogation of Local Flow Phenomena in Twisted Tape Swirled Flow Via Positron Emission Particle Tracking (PEPT)." Advances in Thermal Hydraulics, ATH 2020 (pp. 211–222). Palaiseau, France (October 2020)
- Cody S. Wiggins, Arturo Cabral, Meryem E. Murphy, Candler L. L. Langston, L. B. Carasik, *"Measurements of Pressure Drop in Pipes with Twisted Tape Inserts for Molten Salt Reactor Applications."* Transactions of the American Nuclear Society (Vol. 122(1), pp. 828-830). Virtual Meeting (2020)
- Arturo Cabral, Sasan Bakhtiari, Thomas W. Elmer, Alexander Heifetz, Darius D. Lisowski, L. B. Carasik, "Measurement of Flow in a Mixing Tee Using Ultrasound Doppler Velocimetry for Opaque Fluids." Transactions of the American Nuclear Society (Vol. 121(1), pp. 1643-1645). Washington D.C. (2019)
- Xiong Gao, J. Wesley Hines, Jamie B. Coble, L. B. Carasik "Investigating Sensor Location Effect on the Accuracy of Cross Correlation Flow Estimation with Coolant Injection Using CFD Simulations." Transactions of the American Nuclear Society (Vol. 121(1), pp. 464-467). Washington D.C. (2019)
- Cody Wiggins, L. B. Carasik, A. Ruggles "Lagrangian Measurements in Pipe Flow via Positron Emission Particle Tracking." Transactions of the American Nuclear Society (Vol. 121(1), pp. 1872-1875). Washington D.C. (2019)
- L. B. Carasik, Cody Wiggins, D. R. Shaver "Application and Verification of the Nek5000 Regularized k-ω Turbulence Model to Pipe Flow using Higher-Order Data and PEPT Data." Transactions of the American Nuclear Society (Vol. 121(1), pp. 1699-1702). Washington D.C. (2019)
- 25. L. B. Carasik, V. Patel, S. Judd, P. F. Venneri "Development and Implementation of a 1-D FEM Compressible Flow Module in TRICORDER - A MOOSE-Based Multi-Physics Code." The 18<sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-18), Portland, OR (August 2019)
- L. B. Carasik, M. Eades, V. Patel "Decay Heat Studies to Reduce Active Cooling Time of a Nuclear Thermal Propulsion System." ANS NETS 2019 - Nuclear and Emerging Technologies for Space. Richland, WA (February 2019)
- T. Winkle, M. Eades, V. Patel, L. B. Carasik "Passive and Active Cooling Analysis of Decay Heat Cooling of Nuclear Propulsion Systems." ANS NETS 2019 - Nuclear and Emerging Technologies for Space. Richland, WA (February 2019)
- D. R. Shaver, L. B. Carasik, E. Merzari, N. Salpeter, E. Blandford "Calculation of Friction Factors and Nusselt Numbers for Twisted Elliptical Tube Heat Exchangers using Nek5000." 5<sup>th</sup> Joint US-European Fluids Engineering Division Summer Meeting. Montreal, Canada (2018)
- D. R. Shaver, L. B. Carasik "URANS Simulations of Cross-Flow over a Single Cylinder using Nek5000." Transactions of the American Nuclear Society (Vol. 117(1), pp. 1772-1775). Washington D.C. (2017)
- L. B. Carasik, E. Merzari, Y. A. Hassan "Numerical Simulation of Twin Jets using LES with the Nek5000 Code." Transactions of the American Nuclear Society (Vol. 116(1), pp. 1471-1474). San Francisco, CA (2017)
- J. B. Haefner, L. B. Carasik, Y. A. Hassan "TORCHE Toolbox for Reactor Cross-Flow Heat Exchangers." Transactions of the American Nuclear Society (Vol. 116(1), pp. 1387-1390). San Francisco, CA (2017)
- 32. L. B. Carasik, Y. A. Hassan "Verification and Validation of CFD Simulations involving Twin Jets using Steady RANS in Star-CCM+." International Conference on Mathematics & Computational Methods Applied to Nuclear Science & Engineering (M&C 2017). Jeju, Korea (April 2017)
- 33. L. B. Carasik, H. Wang, Y. A. Hassan "Verification and Validation of CFD Simulations involving Twin Rectangular Jets using Steady RANS in Star-CCM+." Transactions of the American Nuclear Society (Vol. 115(1), pp. 1789-1792). Las Vegas, NV (2016)

- J. B. Haefner, L. B. Carasik, Y. A. Hassan "Development and Verification of MATLAB Functions for Pressure Drop Estimation in Crossflow Tube Bundles." Transactions of the American Nuclear Society (Vol. 115(1), pp. 1535-1537). Las Vegas, NV (2016)
- 35. A. M. Krueger, F. S. Sarikurt, L. B. Carasik, Y. A. Hassan "Uncertainty Quantification by Monte Carlo Analysis using CFD Simulations for GEMIX Benchmark Activities." Transactions of the American Nuclear Society (Vol. 115(1), pp. 1744-1746). Las Vegas, NV (2016)
- 36. L. B. Carasik, S. Lee, A. Cabral, Y. A. Hassan "Temperature Measurements of Thermal Stratification and Turbulent Mixing in Nuclear Systems with a Single Heated Jet." The 24<sup>th</sup> International Conference on Nuclear Engineering (ICONE-24), Charlotte, NC, USA (June 2016)
- 37. L. M. Brockmeyer, L. B. Carasik, E. Merzari, Y. A. Hassan "CFD Investigation of Wire-Wrapped Fuel Rod Bundle Inner Subchannel Behavior and Dependency on Bundle Size." The 24<sup>th</sup> International Conference on Nuclear Engineering (ICONE-24), Charlotte, NC, USA (June 2016)
- L. B. Carasik, D. R. Shaver, Y. A. Hassan "Turbulence Model Study for Pressure and Velocity Distributions for Molten Salts in a Crossflow Tube Bundle." Transactions of the American Nuclear Society (Vol. 114(1), pp. 891—894). New Orleans, Louisiana (2016)
- L. M. Brockmeyer, L. B. Carasik, Y. A. Hassan "Wire-Wrapped Fuel Pin Effect of Bundle Size on Temperature Distribution for Uniform Heat Flux." Transactions of the American Nuclear Society (Vol. 114(1), pp. 888—890). New Orleans, Louisiana (2016)
- L. B. Carasik, D. R. Shaver Y. A. Hassan "Sensitivity of Boundary Conditions and Flow Domain for Pressure Drop Estimation for Molten Salts in a Crossflow Tube Bundle." Transactions of the American Nuclear Society (Vol. 113(1), pp. 1495—1498). Washington D.C. (2015)
- L. B. Carasik, F. Sebilleau, S. P. Walker, Y. A. Hassan "URANS Simulations of Thermal Stratification in a Large Enclosure for Severe Accident Scenarios." The 16<sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-16), Chicago, IL (September 2015)
- 42. L. B. Carasik, Y. A. Hassan, J. W. Clayton "Development of a CFD Model for Pressure Drop Estimation of Molten Salts in a Crossflow Tube Bundle." Transactions of the American Nuclear Society (Vol. 112(1), pp. 944—946). San Antonio, Texas (2015)
- L. B. Carasik, A. E. Ruggles, Y. A. Hassan "Preliminary Investigation of Turbulent Flow Behavior of 3-D Twin Jets using CFD Analysis." Transactions of the American Nuclear Society (Vol. 110(1), pp. 689–692). Reno, Nevada (2014)
- 44. L. B. Carasik, A. E. Ruggles, S. A. Walker "CFD Simulations of Thermal Stratification in a Large Enclosure." In International Congress on Advances in Nuclear Power Plants, ICAPP 2014 (Vol. 2, pp. 1350–1359). Charlotte, North Carolina (April 2014)
- 45. L. B. Carasik, A. E. Ruggles "Enclosure Thermal Stratification within a Twin Jet Mixing Facility." Advances in Thermal Hydraulics, ATH 2012 (pp. 242–245). San Diego, California (November 2012)

## **Conference** Presentations

- 46. L. B. Carasik, E. Merzari, Y. A. Hassan "Developing Verification Data for Twin Free Shear Planar-Like Jets." Nek5000 2018 User Meeting, Tampa, FL (April 2018)
- L. B. Carasik, E. Merzari, Y. A. Hassan "Twin Jet Benchmark Simulations using a Spectral Element Method Code – Nek5000." ASME 2017 Verification and Validation Symposium, Las Vegas, NV (May 2017)
- L. B. Carasik, H. Wang, Y. A. Hassan "Validation and Verification of CFD Simulations involving Twin Rectangular Jets using Steady and Unsteady RANS in Star-CCM+." ASME 2016 Verification and Validation Symposium, Las Vegas, NV (May 2016)
- G. Busco, L. B. Carasik, Y. A. Hassan "Numerical Simulations of Twin Rectangular Jets using ANSYS-CFX for Verification and Validation." ASME 2016 Verification and Validation Symposium, Las Vegas, NV (May 2016)

## Conference Posters

- Lenin Ixcot-Gramajo, L. B. Carasik, Piyush Sabharwall "Review of Fission Product Removal Technologies for Operating and Advanced Reactors." American Nuclear Society Virtual Winter Meeting (November 2020)
- 51. Ryan P. McGuire, Arturo Cabral, Cody Wiggins, L. B. Carasik "Using Additive Manufacturing to Investigate State-of-the-Art Instrumentation in Advanced Reactor Thermal Hydraulic Experiments." American Nuclear Society Virtual Winter Meeting (November 2020)
- 52. Candler Langston, Cody Wiggins, Arturo Cabral, L. B. Carasik "Cooking oils as surrogate fluids for molten salts." American Nuclear Society Virtual Winter Meeting (November 2020)
- Sierra Tutwiler, Arturo Cabral, Cody Wiggins, L. B. Carasik "Design Considerations for Modular Separate Effects Test Facility (MSETF)." American Nuclear Society Winter Meeting and Nuclear Technology Expo, Washington, D.C. (November 2019)
- 54. L. B. Carasik, O. Marin, R. Vinuesa, P. Schlatter, E. Merzari "Investigations of Turbulence Modeling of Hexagonal Duct Flows for Sodium Fast Reactors." American Nuclear Society Winter Meeting and Nuclear Technology Expo, Las Vegas, NV (November 2016)
- 55. L. B. Carasik, F. Sebilleau, S. P. Walker, Y. A. Hassan "Estimate of Development Length for Large Eddy Simulations of a Turbulent Thermal Jet." American Nuclear Society Winter Meeting and Nuclear Technology Expo, Anaheim, CA (November 2014)
- 56. L. B. Carasik, C. R. Baxter, A. E. Ruggles "Thermal Stratification of a Twin Jet Mixing Experiment." University of Tennessee, Knoxville Exhibition of Undergraduate Research and Creative Achievement Engineering (EUReCA '12), Knoxville, TN (April 2012)
- 57. L. B. Carasik, A. E. Ruggles "Thermal Stratification of a Twin Jet Mixing Experiment." American Society Mechanical Engineers International Mechanical Engineering Congress & Exposition (IMECE), Houston, TX (November 2012)
- L. B. Carasik, A. E. Ruggles "CAD Model Connecting Physical Construction and Computational Simulations for CFD." American Nuclear Winter Meeting and Nuclear Technology Expo, Washington, D. C. (November 2011)

## Teaching Experience

### Assistant Professor

Virginia Commonwealth University, Richmond, VA Courses (Undergraduate):

- EGMN 456 Reactor Design & Systems Fall 2020 & 2021
- EGMN 301 Fluid Mechanics Spring 2020 & 2021

Graduate Teaching Fellow - Instructor of Record

Texas A&M University, College Station, TX Courses (Undergraduate):

- NUEN 460 Nuclear Plant Systems and Transients Spring 2017
- NUEN 101 Principles of Nuclear Engineering Fall 2016

#### Guest Lecturer

Texas A&M University, College, TX Courses (Graduate):

- NUEN 624 Nuclear Thermal Hydraulics and Stress Analysis Two Lectures February 2016
- NUEN 623 Nuclear Engineering and Heat Transfer and Fluid Flow One Lecture September 2015

August 2019 - Present

August 2016 – May 2017

## Industrial and Research Internships

**Research Aide - Technical** May 2016 – August 2016 Argonne National Laboratory, Lemont, IL - Nuclear Engineering Division Research Supervisor: E. Merzari Project: • CFD Modeling of Twin Turbulent Jets using the High Order Spectral Element Method Code Nek5000 Graduate Research Intern May 2015 – August 2015 Lawrence Livermore National Laboratory, Livermore, CA – Thermal Fluids Group • CFD Modeling of the Effect of Fibrous Debris Accumulation Effect on Boron Mixing and Local Boron Concentration within a Reactor Core during a Severe Accident June 2014 – August 2014 Imperial College London, London, UK - Centre for Nuclear Engineering • CFD Modeling of Turbulent Thermal Jets using Unsteady Reynolds-Averaged Navier-Stokes and Large Eddy Simulations Summer Visiting Researcher June 2014 - August 2014 • Analysis of Two-Phase Flows in Supersonic Inducing Venturi Nozzles January 2013 – August 2013 • Thermal Hydraulics Analysis for Électricité de France Replacement Steam Generator Project including Steady State and Transient Analysis • CFD studies of generic Steam Generator Feedwater Ring using ANSYS CFX 12.1 **Engineering Intern** May 2012 – August 2012 Westinghouse Electric Company, Chattanooga, TN Project: • Develop Methodology for Steam Generator Feedwater Ring Pressure Loss and Mass Flow Rate Analysis using ANSYS CFX for Verification against Internally-Developed Code. **Engineering Intern** May 2011 – August 2011 Tennessee Valley Authority, Scottsboro, AL

• Provide Support for the Replacement Steam Generator Project for Bellefonte Unit 1 by Conducting Plant Walk Downs and Interfacing with Contractors

#### Undergraduate Research Assistant

Georgia Institute of Technology, Savannah, GA – Systems Realization Laboratory

Research Supervisor: R. J. Jiao Project:

• Develop Innovative Solutions to Manufacturing and Construction Issues relating to BOEING 787 Project

Research Supervisor: W. O. Miller

#### Project:

#### Visiting Researcher

Research Supervisor: S. P. Walker

Project:

CD-Adapco, London, UK

Project:

### **Engineering Intern**

Westinghouse Electric Company, Chattanooga, TN

Projects:

Project:

June 2010 – August 2010

## Grants, Fellowships, Scholarships, & Awards

### Grants and Subcontracts

Statistical Learning Based Multiscale Safety Analysis Framework for Advanced Reactors Period: 2021-2024 Source: Nuclear Regulatory Commission Award Total: \$500,000 Role: Co-Principal Investigator Carasik Allocation: \$210,000 Advanced Manufacturing and Demonstration of Molten Salt Pump Period: 2021-2022 Source: Department of Energy SBIR Award Award Total: \$200,000 Role: Co-Principal Investigator Carasik Allocation: \$60,000 Embedded Fiber Optic Sensors for High Temperature Flow Measurements Period: 2021–2022 Source: Department of Energy STTR Award - Luna Innovation Inc. Award Total: \$200,000 Role: Co-Principal Investigator Carasik Allocation: \$60,000 Virginia Commonwealth University Faculty Development Program in Advanced non-LWR Nuclear Reactor Design and Thermal Hydraulics Period: 2021-2024 Source: Nuclear Regulatory Commission Faculty Development Award Total: \$450,000 Carasik Allocation: \$450,000 Role: Co-Principal Investigator Accelerating the Deployment of Advanced Energy Systems by Improving Heat Transfer Equipment through Additive Manufactured Enhancements Period: 2020-2021 Source: Jeffress Trust Awards Program in Interdisciplinary Research Award Award Total: \$104,500 Carasik Allocation: \$104,500 Role: Principal Investigator Novel Processes for Capture of Radioactive Species in Nuclear Period: 2020-2021 Applications Source: Idaho National Laboratory Subcontract Award Total: \$18,000 Role: Principal Investigator Carasik Allocation: \$18,000 High-Fidelity Simulation for Molten Salt Reactors: Enabling Innovation through Petascale Computing Period: 2018 Source: Dept of Energy ASCR Leadership Computing Challenge Award Award Total: 140M Hours Role: Co-Principal Investigator Carasik Allocation: n/a

Awards

VCU Burnside-Watstein LGBTQIA Award, 2021

ASME Fluids Engineering Division Lewis F. Moody Award, 2020

Co-author on ASME Computational Fluid Dynamics Technical Committee Best Paper Award, 2018

Thermal Hydraulic Track Best Graduate Podium Presentation, American Nuclear Society 2017 Student Conference

Thermal Hydraulic Track Best Graduate Podium Presentation, American Nuclear Society 2016 Student Conference

Summer Student Poster Symposium Best Poster Award, Lawrence Livermore National Laboratory, 2015

College of Engineering Outstanding Undergraduate Student Award, University of Tennessee, Knoxville, 2012

Exhibition of Undergraduate Research and Creative Achievement Engineering Poster Award, University of Tennessee, Knoxville, 2012

#### Fellowships

Dwight Look College of Engineering Graduate Teaching Fellowship, Texas A&M University, Spring 2017 Dwight Look College of Engineering Graduate Teaching Fellowship, Texas A&M University, Fall 2016 Nuclear Engineering University Programs Fellowship, Department of Energy, 2013 – 2016 Dwight Look College of Engineering Graduate Enhancement Fellowship, Texas A&M University, 2013 – 2014

#### Scholarships

Nuclear Engineering University Programs Undergraduate Scholarship, Department of Energy, 2012
Robert T. Liner Memorial Scholarship, American Nuclear Society, 2012
Oak Ridge & Knoxville Local Section Scholarship, American Nuclear Society, 2011
Undergraduate Scholarship, Nuclear Regulatory Commission, 2011
Walter Welch Gentry Scholarship, University of Tennessee, Knoxville, 2011
James B. Porter, Jr Scholarship, University of Tennessee, Knoxville, 2011
Len & Nancy Lois Neubert Scholarship, University of Tennessee, Knoxville, 2010
Engineering Scholarship, University of Tennessee, Knoxville, 2010

## Seminar Presentations and Panels

American Nuclear Society, Young Professionals Congress 2021 November 12th, 2021 "Panel - What if I'm not good enough? - A discussion around Imposter Syndrome" American Nuclear Society, Mathematics & Computation (M&C) 2021 October 5th, 2021 "Panel - Student & Early Career Development Workshop" Texas A& M University, Department of Nuclear Engineering September 15, 2021 "Seminar - Investigations of Heat Transfer Enhancements for Molten Salt Reactor Heat Exchangers and Fusion Device First Wall Heat Removals" American Nuclear Society, 2021 Annual Meeting June 16, 2021 "Executive Panel - Operationalizing Diversity, Equity, and Inclusion (DEI) Statements within the Nuclear Field" American Nuclear Society, 2021 Student Conference April 8, 2021 "Panel - Academic, Research, and Scholarly Disruptions due to COVID" NAYGN, Virtual 2020 Coast to Coast Atlantic & Western Regions Conference November 18, 2020 "Seminar - Nuclear Thermal Hydraulics Research to Support the Deployment of Advanced Nuclear" NAYGN, Virtual 2020 Coast to Coast Atlantic & Western Regions Conference November 17, 2020 "Panel - Diversity and Inclusion" American Nuclear Society, Virtual Winter Meeting November 17, 2020 "Panel - Educational Nuclear Thermal Hydraulics Issues and Challenges of COVID19" **Oregon State University**, School of Nuclear Science and Engineering November 16, 2020 "Seminar - Combined Experimental & Computational Investigations of Thermal Performance of Additively Manufactured Heat Transfer Enhancements for Advanced Nuclear Reactors" American Nuclear Society, Roundtable Series on Racial Justice September 2, 2020 "Webinar - Diversity and Inclusion in Nuclear" Kansas State University, Department of Mechanical and Nuclear Engineering March 2, 2020 "Seminar - Thermal Hydraulics Opportunities to Accelerate the Deployment of Advanced Reactor Designs and the FAST Research Group Approach"

University of Wisconsin, Madison, Department of Energy Physics February 18, 2020 "Seminar - Thermal Hydraulics Opportunities to Accelerate the Deployment of Advanced Reactor Designs and the FAST Research Group Approach"

American Nuclear Society, Winter Meeting and Technology Expo "Panel - Diversity and Inclusion in Nuclear"	November 20, 2019
American Nuclear Society, Winter Meeting and Technology Expo "Panel - Educational Nuclear Thermal Hydraulics Issues and Challenges"	November 19, 2019
American Nuclear Society, Young Professionals Congress 2019 "Panel - Career Development: Planning Career Transitions While Managing	November 16, 2019 Work-Life Balance"
<b>Argonne National Laboratory</b> , Nuclear Science and Engineering "Seminar - Thermal Hydraulics Opportunities to Accelerate the Deployment of and the FAST Research Group Approach"	October 24, 2019 Advanced Reactor Designs
Idaho National Laboratory, Center for Advanced Energy Studies "Seminar - Thermal Hydraulics Opportunities to Accelerate the Deployment of and the FAST Research Group Approach"	October 15, 2019 Advanced Reactor Designs
<b>Pennsylvania State University</b> , Department of Nuclear Engineering "Seminar - Thermal Hydraulics Opportunities to Accelerate the Deployment of and the FAST Research Group Approach"	October 11, 2019 Advanced Reactor Designs
<b>University of New Mexico</b> , Department of Nuclear Engineering "Seminar - Thermal Hydraulics Opportunities to Accelerate the Deployment of and the FAST Research Group Approach"	September 17, 2019 Advanced Reactor Designs
<b>Kennesaw State University</b> , Center for Nuclear Studies "Seminar - Thermal Hydraulics Opportunities to Accelerate the Deployment of and the FAST Research Group Approach"	September 10, 2019 Advanced Reactor Designs
American Nuclear Society, Annual Meeting "Panel - Scaling Methodologies for SET and IET"	June 11, 2019
<b>American Nuclear Society</b> , Annual Meeting "Panel - Focus on Communications: Working with Students (K and Up)"	June 11, 2019
American Nuclear Society, 2019 Student Conference "Panel - Entrepreneurship"	April 5, 2019
<b>American Nuclear Society</b> , Winter Meeting and Technology Expo "Panel - Focus on Communications - Diversity in Organizations"	November 13, 2018
<b>American Nuclear Society</b> , Winter Meeting and Technology Expo "Panel - Getting Involved in a Professional Society"	November 13, 2018
American Nuclear Society, Annual Meeting "Panel - Computational Fluid Dynamics Codes for Nuclear Thermal Hydraul	June 19, 2018 ics Applications"
<b>American Nuclear Society</b> , 2018 Student Conference "Panel - Harnessing Diversity in Nuclear Organizations"	April 7, 2018
American Nuclear Society, 2018 Student Conference "Panel - How to Plan a Successful Student Conference Bid"	April 7, 2018
<b>American Nuclear Society</b> , Winter Meeting and Technology Expo "Panel - Perspectives on Diversity in the Nuclear Industry"	October 30, 2017
<b>Texas A&amp;M University</b> , Department of Nuclear Engineering "Seminar - Nuclear Advocacy - What is it? How can you get involved?"	Sep 20, 2016

## **Professional Activities**

#### Nuclear Technology Journal

#### Guest Editor

Special Section on the ANS 2019 Student Conference at the Virginia Commonwealth University - Vol. 206, Issue 7, pp. iii - DOI: https://doi.org/10.1080/00295450.2020.1775469

Special Section on the ANS 2018 Student Conference at the University of Florida - Vol. 205, Issue 7, pp. iii - DOI: https://doi.org/10.1080/00295450.2019.1617611

Referee/Reviewer, 2018 – Present

#### Nuclear Engineering and Design International Journal

#### Guest Editor

Special Section on the ANS 2017 Student Conference at the University of Pittsburgh

Special Section on the ANS 2016 Student Conference at the University of Wisconsin, Madison - Vol. 325, pp. 245, 2017 - DOI: https://doi.org/10.1016/j.nucengdes.2017.11.020

Special Section on the ANS 2015 Student Conference at the Texas A&M University - Vol. 302, Part B, pp. 69, 2016 - DOI: https://doi.org/10.1016/j.nucengdes.2016.04.041

Referee/Reviewer, 2014 – Present

#### **Fusion Engineering and Design International Journal**

Referee/Reviewer, 2018 – Present

#### American Nuclear Society

Current:

Chair, Diversity and Inclusion Committee, 2019 – Present

Member, External Affairs Committee, 2020 – Present

Faculty Advisor, Virginia Commonwealth University Student Section, 2019 - Present

Executive Committee, Thermal Hydraulics Division, 2013 – Present

Programming Committee, Thermal Hydraulics Division, 2013 - Present

Referee/Reviewer, 2014 – Present

National Member, 2011 – Present

#### Past:

Co-Vice Chair, Diversity and Inclusion Committee, 2018 – 2019

Committee Member, Membership Committee, 2017 – 2019

Chair, Student Section Committee, 2016 - 2019

Co-Vice Chair, Student Section Committee, 2012 – 2016

Student Co-Chair, 2015 ANS Annual Meeting, San Antonio, TX, 2015

Technical Director, 2015 Texas A&M University Student Conference, College Station, TX

President, University of Tennessee, Knoxville Student Section, 2011 – 2012

Student Chair, PHYSOR 2012, Knoxville, TN, April 2012

#### American Society of Mechanical Engineers

Mar 7, 2016

Referee/Reviewer, 2014 – Present General Member, 2012 - Present Assistant-Secretary, Nuclear Engineering Division, 2013 – 2014 **Nuclear Pride** - Nuclear Engineering LGBTQA Organization Executive Committee, 2013 – 2018

Nuclear Engineering Student Delegation - Nuclear Advocacy Group Chair, 2014 – 2015 Vice Chair, 2013 – 2014 Delegate, 2012 – 2013

## Advising

Postdoctoral Researchers Cody Wiggins, Ph.D., 2019 – 2021

Research Staff

Joshua Gateley, 2020-2021

Teesha Payne, 2020-2021

Hugh Feehan, Summer 2021

Ph.D. Students, Primary Advisor:

- Arturo Cabral (Virginia Commonwealth University 2023, expected) James Vulcanoff (Virginia Commonwealth University - 2024, expected) Connor Donlan (Virginia Commonwealth University - 2024, expected) Theodore Chu (Virginia Commonwealth University - 2024, expected) Meryem Murphy (Virginia Commonwealth University - 2025, expected) Aristidis Loumis (Virginia Commonwealth University - 2025, expected)
- Ph.D. Students, Committee Member:

Caroline Campbell (Virginia Commonwealth University - 2022, expected) Xiong Gao (University of Tennessee, Knoxville - 2020)

### Undergraduate Students:

Sierra Tutwiler (B.S. Mech & Nuclear E. - 2023, expected)

Candler Langston (B.S. Mech & Nuclear E. - 2023, expected)

Ryan McGuire (B.S. Mech & Nuclear E. - 2023, expected)

Jerel Houston (B.S. Mech & Nuclear E. - 2023, expected)

Adam Mafi (B.S. Mech & Nuclear E. - 2023, expected)

#### Alumni:

Lenin Ixcot-Gramajo (B.S. Chem E. - 2022, expected)

Teesha Payne (B.S. Mech & Nuclear E. - 2021)

Joshua Gateley (B.S. Mech & Nuclear E. - 2021)

Meryem Murphy (B.S. Mech & Nuclear E. - 2021)