Jessica M. Johnson, Ph.D., Ed.S.

CURRICULUM VITAE

Old Dominion University
Office of Enterprise Research & Innovation
Virginia Digital Maritime Center
Suffolk, VA 23435

j17johnso@odu.edu
757-635-9973

EDUCATION

Regent University, Virginia Beach, VA — May 2023
Ph.D., Educational Psychology
Dissertation: *Facilitating Self-Directedness: A Meta-Analysis Examining Autonomous Learning in Simulations*

Regent University, Virginia Beach, VA — May 2020
Ed.S., Educational Psychology

Regent University, Virginia Beach, VA — Dec. 2007
M.Ed., Curriculum Instruction/Design

Edinboro University, Edinboro, PA — Dec. 2005
B.S., Cognitive Psychology

CERTIFICATIONS, WORKSHOPS, ADDT'L PD COURSES

Human Factors and Ergonomics Graduate Certificate	UC Berkely	*2026
User Experience Research Certification	Nielsen Norman Group	*2027
Cognitive Task Analysis	Cognitive Task Analysis Institute	

APPLIED RESEARCH FOCI

Research Domain(s): Cognitive Engineering, Cognitive Ergonomics

Research Interests: Adaptive Autonomy and Dynamic Decision Making

- Human-Autonomy Teaming
- Macrocognition
- Cognitive Modeling
- Multimodal, Simulation-Based Learning & Training

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CURRICULUM VITAE

ACADEMIC AND RESEARCH POSITIONS

2025- present **Director- Applied Cognitive Engineering and Simulation Lab**
Office of Enterprise Research and Innovation
Old Dominion University

2022- present **Research Assistant Professor**
Virginia Digital Maritime Center
Office of Enterprise Research and Innovation (formerly VMASC)
Old Dominion University

2007- present **CEO and Learning Engineer**
Cognaverse, LLC
-Learning engineering consultant
-Simulation and technology content development for learning and training systems (K-12, community college, higher education, industry)

2021- 2025 **Director of STEM and Educational Partnerships**
Virginia Modeling Analysis & Simulation Center (VMASC)
Old Dominion University

2019- 2022 **Curriculum Coordinator**
Virginia Modeling Analysis & Simulation Center (VMASC)
Old Dominion University

2018-2019 **Instructional Designer**
Virginia Modeling Analysis & Simulation Center (VMASC)
Old Dominion University

2018-2019 **Educator**
Isle of Wight Public Schools, Isle of Wight, VA

2007- 2018 **Educator, Curriculum Writing Committee Chair, Differentiated Instruction Lead Teacher, STEM Coordinator,**
Suffolk Public Schools, Suffolk, VA.

PROFICIENCIES

Cognitive and Learning Engineering: Cognitive task analysis, work task analysis, needs assessment, learner analysis, context analysis, modality analysis, technology readiness assessment, technology adoption assessment, data thematic analysis, effectiveness studies in virtual environments. Researched, designed, and developed systems compatible with human cognitive abilities and limitations. Human performance technology assessment to address gaps between desired and observed performance. Embed knowledge engineering topics such as knowledge acquisition, knowledge representation, inference and reasoning, knowledge refinement, and knowledge integration in virtual and multimodal systems.

Simulations, Simulators, Virtual Environments, & Extended Reality (AR, VR, XR): Design, development, validation, and measurement of learning in various simulations, simulators, and virtual/augmented environments for education, training, assessment, and research. Experience in designing, developing, and integrating instructional simulations and games in K-industry settings. Design of simulator scenarios for education, training, and assessment. Determination of simulator fidelity needs based on task analyses and instructional objectives or measurement outcomes. Utilize a learning engineering approach to training challenges for pre-hire workforce through the deployment of integrative learning technologies (virtual reality, augmented reality, 3D models, etc.) and embedded competencies or state educational standards of learning.

Contributions to Cognitive and Learning Science: Collaborated with Department of Defense and Design Interactive in the applied research and prototype design of an embedded competency-based content curation and distribution engine for multimodal content sharing systems, incorporating augmented reality and extended reality components. A performance gap analysis and cognitive task analysis was conducted on the integration of artificial intelligence (AI) and machine learning (ML) capability features through the scope of human-centered data deployment.

STEM Outreach: Worked/developed outreach to advance programs for modeling and simulation engagement in multiple capacities. Organized and led modeling and simulation summer camps for middle school students, K-12 educator externships, expansion of a modeling and simulation capstone conference from K-12 to higher education, and year-round workshops integrating advanced learning technologies within engineering design challenges for K through community college levels.

External Funding & Project Management: Developing and writing proposals for external funding. Aligning SoW to milestones, deliverables, assigning and hiring personnel, and project management. Building R&D relationships. Disseminating results. Awarded, led, and collaborated on teams for major grants ranging from private industry partners, internal research and development projects, K-12 school divisions, military, and government entities totaling over $8,000,000 to date.

PROFESSIONAL MEMEBERSHIPS & SOCIETIES

IEEE Industry Consortium of Learning Engineering (ICICLE)
IEEE ICICLE Design for Learners
National Defense Industrial Association (NDIA) Human Systems Division
Department of Education's Modeling and Simulation Program Task Force
Executive Committee, IEEE Learning Engineering Conference 2023-present
STEM Chair and Executive Committee Member, MODSIM World Conference 2022-present
Co-Chair Modeling Simulation & Visualization Student Capstone Conference, Old Dominion University 2022-2024

Journal and Conference Paper Reviewer

International Society of the Learning Sciences 2025-present

Simulation Transactions of the Society for Modeling and Simulation International, (peer-reviewed international journal) 2023- present

Grant Peer-Reviewer

Growth and Opportunity Virginia (GoVA), Simulation & Training SME 2025- present

HONORS, AWARDS, AND PRIZES

Dissertation of the Year Nominee	Regent University	2022
Rookie Teacher of the Year	Suffolk Public Schools	2008

SPONSORED RESEARCH

Total to Date: (as PI and Co-PI External Funding): $8,772,316.36

Current Grants & Projects (as PI and Co-PI)

Johnson, J., Renne, J., Garcia, H., Shull, J. (April 2025 – April 2027). Schools Harnessing Innovative Industry 4.0/5.0 Processes and Systems. Blue Force Alliance; Submarine Industrial Base

- Role on grant: PI
- Total Award: $1,500,000
- Research Credit: 30%
- Duration: 2 years
- ***Follow on 2 years, for $2 million in 2026-2028

Johnson, J., Jovanovic, V., Dudley, J. (July 2024 – April 2026). SMART Manufacturing Multimodal Training, in collaboration with GENEDGE. Department of Energy. **$300,000**

- Role on grant: PI
- Total Award: $300,000
- Research Credit: 40%
- Duration: 2 years

Czack, R., **Johnson, J**., Smith, K. Dudley, J., Garcia, H., Cvijetic, B., Lynch, C. (March 2025 – February 2027). Supervisors of Shipbuilding (SUPSHIP) Workforce 4.0/5.0 Training. Blue Forge Alliance, Maritime Industrial Base in partnership with SUPSHIP Newport News Shipbuilding.

- Role on grant: Co-PI
- Total Award: $1,291,295
- Research Credit: 20%
- Duration: 2 years

Smith-Mutegi, D., **Johnson, J**. Morton, C. (August 2024 – November 2025). Deepening and Expanding Research-Practice Collaborative to Identify STEM Programming with Emergent Technologies

- Role on grant: Co-PI
- Total award: $149,403
- Research Credit: 30%
- Duration: 15 months

Johnson, J., Renne, J., Dudley, J., Shull, J., Garcia, H., Cvijetic, B. (January 2024 – December 2024). Immersive STEM Maritime Program. Navy Maritime Programming Funding, in collaboration with Hampton Roads Workforce Council, Virginia Ship Repair Association, Newport News Shipyard

- Role on grant: PI
- Total Award: $900,000
- Research Credit: 20%
- Duration: 10 months

Focus: Design and development of an open-source, interactive web platform to expose and engage regional middle schools in maritime exploration. Project is grounded in evidenced-based principles and applied research of learner experience design and learning sciences to engage students through modeling and simulation technologies for learning: online, interactive 360 environments, 3D models for complex and abstract concepts, hands-on projects featuring no technology and technology (3D printing, CNC, etc.)

Johnson, J., **M** Garcia, H., Cvijetic, B., Dudley, J. (May 2023- April 2025). Maritime Entry to Employment (MEET). Reinvent Hampton Roads- GO Virginia.

- Role on grant: PI
- Total Award: $1,090,527
- Research Credit: 15%

- Duration: 2 years

Focus: Enhance current skilled trades training courses to embed modeling and simulation technologies for QED, TCC STA, and NCI. An online Pipefitter course will be developed and launched to QED and TCC STA, welding simulators to be embedded in QED's welding course, and a Fiber Optics course will be designed by industry to be utilized at QED, TCC STA, and NCI. Aspects of embedded research will be to investigate the design of cognitive models of expertise that can inform future designs of simulation-based training for skilled trades.

Johnson, J. M. (2023-2027). Technology Enhanced Language Learning in Virtual Reality. Department of Defense Education Activity (DoDEA). Virginia's Modeling, Analysis & Simulation Center at Old Dominion University (ODU-VMASC) collaboration with York County Public Schools, Virginia.

- Role on grant: PI
- Total Award: $482,000
- Research Credit: 60%
- Duration: 4 years

Focus: Spaced repetition models for learning and training in virtual reality, designed specifically for language acquisition. Applied research on contextualized learning environments and cognitive load theory in language acquisition.

Grants Awarded and Completed (as PI)

Johnson, J., Shetty, S., Papelis, Y., Padilla, J., Freydenlund, E., Diaz, R., Smith, K., Nelson, K., Rechowicz, K., Draper-Amason, D., Richter, H. (2022-2024). Graduate Research Opportunities and Workforce Readiness in Modeling and Simulation (GROW M&S). Department of Education Modeling and Simulation Program

- Role on grant: PI
- Total Award: $1,155,000
- Research Credit: 30%
- Duration: 2 years

Focus: Funding of graduate research opportunities for interdisciplinary modeling and simulation research; collaborating with University of Central Florida, VMASC, and ODU faculty in addition to industry partners.

Johnson, J., Robinson, M., Garcia, H., Renne, J., Dudley, J. Cvijetic, B. (September 2022-February 2024). Maritime Trades Magnet. Department of Education grant. Old Dominion University**.**

- Role on grant: PI
- Total Award: $1,000,000
- Research Credit: 50%
- Duration: 2 years

Focus: Maritime Trades Magnet project kicked off in Fall 2023 assisting regional school divisions in connecting advanced manufacturing equipment to CTE courses and maritime careers. To date over 250 10th and 11th grade students have learned how to safely operate the 3D

printers, desktop CNC machines, and robotics equipment provided to eleven schools in Newport News, Hampton, Norfolk, Portsmouth, Suffolk, and Chesapeake. The team utilized schools' CTE instructors integrating their feedback to improve the MTM online learning resource and aligned projects. Additionally, the MTM project has partnered with the New Horizons Regional Education Center, the Brooks Crossing Innovation Lab, and the City of Norfolk's Parks and Recreation Department to offer summer programs. The project ended 2/29/2024. All reports were submitted to Dept. of Ed.

Johnson, J., Renne, J. (April 2023- October 2023) Maritime Trades Training Curriculum Development. Virginia's Modeling, Analysis & Simulation Center at Old Dominion University (ODU-VMASC) collaboration with Virginia Ship Repair Association and the Community College Workforce Cooperative (CCWC)

- Role on grant: PI
- Total Award: $60,000
- Research Credit: 60%
- Duration: 6 months

Focus: Collaboration with the Virginia Ship Repair Association, Tidewater Community College's Skilled Trades Academy, Camp Community College, and Virginia Peninsula Community College, and the Community College Workforce Cooperative to develop new curriculum for the Marine Trades Training program. Work includes the development of Level 2 curriculum for Marine Electrician, Outside Machinist, and Marine Painting as an extension to MTT Level 1 content. In this collaboration, the team worked alongside valued subject matter experts from various shipyards in the region to develop the content, training schedule, curriculum, and projects. The courses are in final review stages with stakeholders and will launch with piloted cohorts in the Spring/Summer of 2024.

Johnson, J. (January 2022-August 2023). STEM and Student Engagement. Internal Research and Development (ODU-VMASC).

- Role on grant: PI
- Total Award: $181,000
- Research Credit: 100%
- Duration: 1 year

Focus: Research internship experiences for undergraduate and graduate students from interdisciplinary departments and programs

Johnson, J., Garcia, H. (November 2021- March 2022). Marine Trades Training Pipefitter Simulations. Virginia Ship Repair Association

- Role on grant: PI
- Total Award: $25,000
- Research Credit: 75%
- Duration: 1 year

Focus: Integrative modeling and simulation technology development for maritime training. Collaborated with the Virginia Ship Repair Association and Tidewater Community College's Skilled Trades Academy to design and develop modeling and simulation technology

tools to enhance the MTT Level 1 Pipefitter course. After analysis of content and curriculum, feedback from instructors, and students a gap emerged in the knowledge to skill transfer in reading/understanding 2D blueprints and the utilization of math/measurement in Pipefitting trade. A 3D model of a blueprint was designed and deployed. A 3D printed, hands-on mockup was designed and deployed. An augmented reality inspection app was designed and deployed for the instructor to inspect the physical mockup. An initial iteration of a virtual reality module was designed for immersive exploration of the 3D model.

Johnson, J., Smith, K., & Ayaz, G. (October 2021- September 2022). Agile Learning Linked Holistically as Naval Design STEM Experiences for Teachers (ALL HANDS). Internal Research and Development (ODU-VMASC).

- Role on grant: PI
- Total Award: $45,000
- Research Credit: 75%
- Duration: 1 year

Exploratory research in pedagogical digital twins for use by educators.

Johnson, J., Smith, K., & Bothel, T. (October 2021-October 2022). Maritime Careers Experience (MCx). Epic Games MegaGrant

- Role on grant: PI
- Total Award: $75,000
- Research Credit: 75%
- Duration: 1 year

Exploration of virtual reality design and utilization for maritime training, training for team in Unreal Engine.

Johnson, J. (2021- 2023) Propelling STEM: Gamified Educational STEM Careers and Simulations. Newport News Public Schools, Newport News Shipbuilding in partnership with Virginia's Modeling, Analysis & Simulation Center at Old Dominion University (ODU-VMASC)

- Role on grant: PI
- Total Award: $185,000
- Research Credit: 60%
- Duration: 2 years

Focus: Conceptual design of a Learner Mechanic-Game Mechanic Taxonomy Model targeting a future workforce, Coastal Coders seeks to inform learners through immersive serious games and simulations connections between computer science and over nine emergent technologies revolutionizing sectors of the maritime industry. Users explore computational thinking challenges and VDOE computer science standards as they navigate various careers and examples of maritime emergent technologies in their everyday lives. ODU Game Design students and educators have worked to help design content and themes throughout the project. Coastal Coders launches to Newport News Public Schools in Fall 2023 with expansion plans for all regional school divisions and future funding across the state of Virginia. This project is supported by Newport News Public Schools and Newport News Shipbuilding.

Johnson, J. (2020) National PTA and Huntington Ingalls Industries: National STEM+ Families Program

- Role on grant: PI
- Total Award: $10,000
- Research Credit: 100%
- Duration: 1 year

Focus: Curriculum development

Grants Awarded and Completed (as Co-PI)

Smith, K. **Johnson, J**. (July 1, 2023 – Dec. 31, 2023) Operationally Directed Instructional Network- Engineering Library. Valkyrie and Department of Defense

- Role on grant: Co-PI
- Total Award: $105,993.60
- Research Credit: 30%
- Duration: 6 months

Smith, K., **Johnson, J.** (April 2023-December 2024). SBIR Phase II CACHE (ODU-VMASC and Design Interactive).

- Role on grant: Co-PI
- Total Award: $225,000
- Research Credit: 30%
- Duration: 1 year

Smith, K., **Johnson, J. (**July 2021 June 2022). Operationally Directed Instructional Network Engineering Library, Option Year 2.

- Role on grant: Co-PI
- Total Award: $37,097.76
- Research Credit: 30%
- Duration: 1 year

Smith, K., **Johnson, J.** (June 1, 2022-November 14, 2022). SBIR CACHE (ODU-VMASC and Design Interactive).

- Role on grant: Co-PI
- Total Award: $30,000
- Research Credit: 30% Duration: 3 years
- Duration: 6 months

Smith, K., **Johnson, J.**, Diaz, R. (May 2021- May 2022). Digital Shipbuilding Modeling & Simulation Development and Lab Support. Internal Research & Development. (ODU-VMASC).

- Role on grant: Co-PI
- Total Award: $73,000
- Research Credit: 25%

- Duration: 1 year

Ezell, B., **Johnson, J**., Lynch, C., Amason-Draper, D. (2021-2023) Federal Law Enforcement Training Center (FLETC) Training Systems Curriculum Study with Systems Engineering Research Center (SERC) & Virginia's Modeling, Analysis & Simulation Center at Old Dominion University (ODU-VMASC)

- Role on grant: Co-PI
- Total Award: $750,000
- Research Credit: 20%
- Duration: 2 years

Smith, K., **Johnson, J**. (2021) CACHE: Collaborative Automated Curation Holistic Engine. In partnership with Design Interactive & Virginia's Modeling, Analysis & Simulation Center at Old Dominion University (ODU-VMASC)

- Role on grant: Co-PI
- Total Award: $42,000
- Research Credit: 30%
- Duration: 1 year

Smith, K**. Johnson, J.** (2021). TED Text: SMS based Micro-Learning. USAF in partnership with Virginia's Modeling, Analysis & Simulation Center at Old Dominion University (ODU-VMASC)

- Role on grant: Co-PI
- Total Award: $58,500
- Research Credit: 30%
- Duration: 1 year

Smith, K. **Johnson, J**. (2020- 2023) Operationally Directed Instructional Network- Engineering Library. Valkyrie and Department of Defense
Role on grant: Co-PI

- Total Award: $605,500
- Research Credit: 30%
- Duration: 3 years

Garcia, H. **Johnson, J**. (2020-2021). Human-Machine Inclusive Interface Design: Accessible Interfaces for Underrepresented Populations. Commonwealth Center for Advancement Manufacturing, Va. in partnership with Virginia's Modeling, Analysis & Simulation Center at Old Dominion University (ODU-VMASC)

- Role on grant: Co-PI
- Total Award: $50,000
- Research Credit: 14%
- Duration: 1 year

Grant Applications in Progress/In Review

Johnson, J.M., Jovanovic, V., Rechowicz, R., Katsiouloudis, P. (January 2026 – June 2026). Pioneering Industry 5.0 Smart Mock-Ups in Maritime Skilled Trades. Stimulating Transdisciplinary Research Collaboration (STaR). Old Dominion University. **$50,000**

Johnson, J.M., Jovanovic, V., Renne, J. (April 2026 – April 2028). SMART Manufacturing Multimodal Training, in collaboration with GENEDGE. Department of Energy. **$300,000**

- Role on grant: PI
- Total Award: $300,000
- Research Credit: 40%
- Duration: 2 years

Johnson, J. M., Smith, K., Draper-Amason, D. (September 2025 – August 2027). Cognitive Training Impacts of Welding Simulators Integrated in Skilled Trades Training Programs: A Meta-Analysis. Institute of Education Sciences.

- Role on grant: PI
- Total Award: $379,716
- Research Credit: 20%
- Duration: 2 years

Grant Applications Not Funded

Jayarathna, S., Johnson, J.M. (July 2025- July 2026). Broadening Participation in Drone Pilot Education Through Virtual Reality: Empowering Neurodiverse Populations. National Science Foundation. **$2,758,901**

Shetty, S**., Johnson, J., M.** (7/2025 - 6/2030). Consortium for Reactor Safety Training (CReST) Department of Energy. **$1,163,202.**

Jayarathna, S., Perotti, A., **Johnson, J.M.** (July 2025-July 2028). Virtual Ecosystem for STEM Teaching (VEST): Facilitating STEM Education for Youth at Risk of School Failure. National Science Foundation DRK12. **$2,872,853.**

Johnson, J., Renne, J. (December 2024 – December 2027). **Seas the Future** High School Summer Research Residency: Pedagogical Digital Twins. ACT Grant, Bayport Credit Union. (**$500,000)**.

Watson, G**., Johnson, J.,** Snell, J. (February 2024- July 2024). XR for Use in Naval Shipyard Industrial Environments. SBIR in collaboration with Charles Rivers Analytics. **($25,000).**

Smith, K., Diaz, R., & **Johnson, J.** (July 2024 – June 2025). Open Data Science with Kamodo. NASA Roses. **($100,000).**

Johnson, J., Goranson, T., Cardier, B., Jayarathna, S., Shull, J., & Renne, J. (July 2024-June 2027 Ontologies of Multimodal Learning Analytics for Skilled Trades Expertise. Institute of Education Sciences, Cognition and Learning **($1,400,000)**

Johnson, J., Snell, J., Shull, J., Garcia, H. & Renne, J. (September 2024-August 2027) Exploration of Math Literacy Ontological Models in Maritime Trades Training. Institute of Education Sciences, Adult/Postsecondary Education. (**$1,300,000).**

Johnson, J., Smith, K., Jayarathana, S., Draper-Amason, D., Garcia, H., Shull, J., & Renne, J. (June 2024- May 2027). A Theory-Driven Investigation of Integrated Multimodal Learning Analytics in Complex, Authentic Learning Environments. Institute of Education Sciences, Cognition and Learning (**$3,000,000)**

Johnson, J., Smith, K., Shull, J. (September 2023- December 2024). Learning Engineering Approach to Immersive Digital Twin Design for Learning and Training. Unity Engine Workforce Grant**; ($200,000)**.

Whytlaw, J., **Johnson, J**. Increasing Inclusion in Undergraduate Education Through Immersive Technologies. National Science Foundation. (**$2,000,000**)

Bowles, D., Johnson, J., Shetty, S., Papelis, Y. National Science Foundation: Engine. (**$178,101)**.

Ferrell, V., **Johnson, J.** (2022) iQuest. National Science Foundation: ITEST. (**$1,277.000)**.

Johnson, J., Smith, K., Ball, P. (2021). Urban STEM Ecology Adventures (U-SEA). Virginia Wildlife Grant program; Summer Internship program; (**$9,250)**.

Johnson, J., Smith, K., Bothel, T., Garner, J. (2021). Agile Learning Linked Holistically as Naval Design STEM Experiences for Teachers (ALL HANDS). Grant submitted to Office of Naval Research STEM Education & Workforce; (**$520,000).**

Johnson, J., Smith, K. (2021). Youth Builders Pre-Apprenticeship Program (YB-PreP). Grant submitted to Office of Naval Research STEM Education & Workforce; (**$320,000).**

Johnson, J., Smith, K. (2020). Navigating the Engineering Design Process Through Augmented Reality Simulations (NavED). Grant submitted to National Science Foundation- Advanced Informal STEM Learning (AISL); (**$296,621)**.

Johnson, J., Smith, K. (2020). Youth Builders Pre-Apprenticeship Program: Propelling Advanced Technology Education for the Maritime Industry. Grant submitted to National Science Foundation- Advanced Technical Education (ATE); (**$372, 529)**.

Johnson, J., Smith, K., Shen, Y., Jovanovic, V., Loney, M., Tonelson, S. (2020). Reframing Failure: An Immersive Simulation Approach to Experimental Design for Urban Secondary

Students. Grant application submitted to National Science Foundation- Innovation and Technology for Education, Students, and Teachers (ITEST); (**$620,000).**

Johnson, J., Smith, K., & Bothel, T. (2020). Envision, Enact, Embody (E3): Empowering Tomorrow's Naval STEM Workforce. Grant application submitted to Office of Naval Research Science; (**$750,000)**.

Johnson, J. (2020). Dive Into Robotics: Underwater ROVs Summer Camp. Grant application submitted to American Society of Naval Engineers Tidewater Section; (**$5,000)**.

Giles, B., J**ohnson, J**., Joe, M., Garner, J., Crompton, H., Shetty, S., & Smith, K. (2020). STEM University Partnership (STEMup!). Grant application submitted to National Defense Education Program for Science Technology Engineering & Math (NDEP STEM); (**$2,995,000)**.

Johnson, J., Smith, K., & Bothel, T. (2019). Girls Making Waves: Propelling Immersive, Experiential STEM Informal Learning. Grant application submitted to National Science Foundation; **($1,865,000)**.

Smith, K., **Johnson, J**. & Bothel, T. (2019). Engaging and Empowering Future and Current Digital Shipbuilding Workforce Through Transdisciplinary Experiences in Artificial Intelligence. Grant application submitted to Office of Naval Research; (**$750,000)**.

Smith, K., **Johnson, J**., & Diaz, R. (2019). Workforce Development in Applachia to Support Shipbuilding Demand. Department of Labor; (**$600,000)**.

PUBLICATIONS

RESEARCH AND MANUSCRIPTS UNDER REVIEW

RESEARCH AND MANUSCRIPTS IN PREPARATION

Johnson, J.M. Assessing the Transfer of Macrocognitive Skills from VR Simulations to Real-World Maritime Environments. *Proceedings of the International Conference on Cognition & Exploratory Learning in Digital Age*. November 1-3. Porto, Portugal.

Johnson, J.M. The Role of Technology-Enhanced Simulation in Refining Learners' Mental Models for Complex Decision Making. *Proceedings of the International Conference on Cognition & Exploratory Learning in Digital Age*. November 1-3. Porto, Portugal.

Peer-Reviewed Journal Articles

Book and Handbook Chapters

Johnson, J.M. Learning, Unlearning, and Relearning: Embracing Radical Technology Shifts for Teaching and Learning. STEM Century: It Takes a Village to Raise A 21st Century STEM Graduate. August 2023.

Peer-Reviewed Conference Papers

Johnson, J.M. Advancing Expertise Development Through Adaptive Human-AI Training. *Proceedings of the 2025 Interservice/Industry Training Simulation and Education Conference*. December 1-4. Orlando, Florida.

- Acceptance rate: ~25%

Johnson, J., M. Cognitive Task Analysis in the Age of AI. *Proceedings of the 2025 ModSim World Conference. August 18-20, 2025. Norfolk, Virginia.*

- *Acceptance rate: ~60%*

Johnson, J. M., Buczkowski, A., Cvijetic, B. "The Role of 3D Asset Design in Simulation-Based Cognitive Training". *Proceedings of the 2025 ModSim World Conference. August 18-20, 2025. Norfolk, Virginia.*

- *Acceptance rate: ~60%*

Johnson, J. M., Connolly, A., Shull, J., Garcia, H. "Designing for Transfer: Developing a Skill-Based Simulation Using Learning Engineering Design Frameworks". *Proceedings of the 2025 ModSim World Conference. August 18-20, 2025. Norfolk, Virginia.*

- *Acceptance rate: ~60%*

Johnson, J. M. "Macrocognition in Simulation-Based Training: Practical Applications of Learning Engineering in Complex Environments" *Proceedings of the 2025 International Conference on Adaptive Instructional Systems and Human Computer Interaction International 2025*. June 22-27, 2025.

- *Acceptance rate: ~25%*

Johnson, J. M., Stephenson, T., Shull, J., Kumm, A. "Integrating Knowledge Building in Virtual Reality: A Collaborative Learning Framework for Technology Enhanced Language Learning". *Proceedings of the 18th International Conference on Computer-Supported Collaborative Learning*. June 10-13, 2025. Helsinki, Finland.

- *Acceptance rate: ~30%*

Ayaz, G., & **Johnson, J**. "Enhancing Maritime Trades Training Through Gamified Experiences and Interactive Technologies." *Proceedings of the 17th Annual Old Dominion University Modeling and Simulation Capstone Conference*. April 11th, 2024.

Evans, Z., **Johnson, J.M,** Kumm, A., & Shull, J. "From Virtual Cities to Simulated Restaurants: A New Frontier for Collaborative Language Learning in Virtual Environments". *Proceedings of the 17th Annual Old Dominion University Modeling and Simulation Capstone Conference*. April 11th, 2024.

Smith, K., **Johnson, J.,** Ayaz, G., Horner, C. "Phased Framework for Automated Educational Content Curation." *Proceedings of the 13th International Conference on Education, Training, and Informatics*. Orlando, FL. March 8-11, 2022.

Johnson, J., Smith, K., Dennis, T., Jimenez, G. "Adaptive Assessment Feedback in Competency Based Learning Ecosystems." *Proceedings of the Interservice Industry Training, Simulation & Education Conference.* Orlando, FL. November 29-December 3, 2021.

Smith, K., **Johnson, J**., Dennis, T. "Leveraging Legacy Training in Modern Systems: Framework and Implementation." *Proceedings of the Interservice Industry Training, Simulation & Education Conference.* Orlando, FL. November 29-December 3, 2021.

Smith, K., **Johnson, J**. "Uniting Modern Educational Communication Protocols with Traditional Educational Taxonomies." *Proceedings of the 2021 MSVE Student Capstone Conference*. Old Dominion University, Suffolk, VA. April 22, 2021.

Peer-Reviewed Conference Presentations

Johnson, J.M., Smith-Mutegi, D., Barnes, K., Morton, C., & Blount, I. "Deepening and Expanding a Research-Practice Collaborative on Informal Emerging Technology Learning in Counterspaces. *Proceedings of the STEMS Symposium*, O'ahu, Hawaii, June 24-25, 2025

Johnson, J. Multimodal Simulation-Based Skilled Trades Training: An Integration of Learning Engineering Design Processes. *Proceedings of the ICICLE 2024 Learning Engineering Conference, IEEE ICICLE,* Tempe, AZ. July 22-24, 2024.

Draper-Amason, D., Ezell, B., **Johnson, J**., Handley, H., & Lynch, C. Modeling and Simulation Training Systems Curriculum Study. *Proceedings of the 2024 Performance Improvement Conference*, Fort McDowell, TX. May 5-9, 2024.

Shanta, Susheela, **Johnson, J**., Renne, J., Russell, K. "Ethics in AI and STEM Education." *Proceedings of the International Technology and Engineering Educators Association, ITEEA,* Memphis, TN. March 6-9, 2024.

Renne, J., **Johnson, J**. "Navigating New Waters: Applications of XR and Integrative Technologies in the Classroom." *Proceedings of the Virginia Society for Technology in Education Conference, VSTE, Roanoke, VA.* Dec 3-5, 2023.

Johnson, J. "Deploying Integrative Instructional & Immersive Learning Environments with Engineering Design Challenges". *2020 National Center for Simulation Student Training Day*, Orlando, FL, February 24- 25, 2020.

Kosteczko, J., Smith, K., **Johnson, J.**, Diaz, R. "Virginia Digital Shipbuilding Program (VDSP) "Building an agile modern workforce to improve performance in the shipbuilding and ship repair industry." *Proceedings of the 2020 ASEE Annual Conference & Exposition.* Virtual Online, June 21-24, 2020. doi: https://doi.org/10.18260/1-2--35487.

Johnson, J. "Advanced Learning Technologies in the Classroom: An Analysis Design for Education 4.0". *Proceedings of the 2020 Southwest Virginia Higher Education Center Education & Training Conference,* Bristol, VA, December 1, 2020.

Johnson, J. "Integrative Engineering Design Challenges for the K-12 Classroom". *Proceedings of the 2019 Interservice Industry Training, Simulation and Education Conference*, Orlando, FL, December 2-5, 2019.

Smith, K., **Johnson, J**., Bothel, T. "Leveraging a STEM Ecosystem to Promote Connections throughout the Maritime Workforce Pipeline." *Proceedings of the 2019 International Conference on Social and Education Sciences*, Denver CO, October 7-10, 2019.

Johnson, J., Bothel, T., & Smith, K. "Charting the Course: Integrating Advanced Learning Technologies to Motivate STEM Maritime Career Pathways". *Proceedings of the 2019 International Conference on Social and Education Sciences*, Denver CO, October 7-10, 2019.

Johnson, J. "Neuroscience of STEMgagement: Leveraging STEM Learning Ecosystems". *Proceedings of the Virginia Military Institute STEM Conference,* Lexington VA, September 30-October 1, 2019.

Johnson, J. "Digital Ship Connections to the K-12 Classroom: Digital Transformation Technologies" *Demo 2019 Capital Hill Modeling and Simulation Expo*, Washington, D.C, July 10, 2019.

State and Regional Conference and Workshop Presentations

Johnson, J.M. Hiring Gen Z: Challenges, Solutions, & Workplace Success Panel. Hiring Gen Z: Attracting, Engaging, and Retaining the Future Workshop, Old Dominion University Office of Enterprise Research and Innovation sponsored by Hampton Roads Workforce Council. Suffolk, VA, April 2, 2025.

Johnson, J. M., & Dudley, J. "A Smarter Future: Smart Manufacturing Education & Training". CESMII Roadshow 2025. Commonwealth Center for Advanced Manufacturing (CCAM), Disputanta, VA, March 27, 2025.

Johnson, J. Workforce Development Panel**.** *American Society of Naval Engineers Fleet Maintenance and Modernization Show*, September 16-18, 2024.

Johnson, J. Renee, J. Women in Skilled Careers Summit 2023. Work Like a Girl program. Hampton Roads Workforce Council and WHRO Public Media. June 8, 2023.

Johnson, J. "LeARn: Immersive Learning Environments and Innovative Technologies to Support Girls in STEM". *Proceedings of the SHE CAN STEM Conference*, Virginia Beach, VA. April 8, 2021.

Johnson, J., Smith, K., & Russel, J. "Operationally Directed Instructional Network- Engineering Library for Competency-Based Training (ODIN-EL)". *Proceedings of the Navy Afloat Maintenance Training Strategy (NAMTS) Conference*, Virginia Beach, VA. April 7-9, 2021.

Johnson, J. "Disrupting Learning with Advanced Learning Technologies". *Proceedings of the 2021 STEMFest Conference*, Reynolds Community College, Richmond VA, March 1st, 2021.

Johnson, J. "Engineering Design Process in the Classroom". *Proceedings of the 2020 Norfolk Naval Shipyard STEM Conference*, Portsmouth, VA, March 23, 2020.

Johnson, J. "Advanced Learning Technologies within the Modeling and Simulation Engineering Classroom". *Proceedings of the 2019 Southwest Virginia Higher Education Center Education & Training Conference,* Bristol, VA, November 12-13, 2019.

Johnson, J. "STEM Workforce of the Future". Norfolk Naval Shipyard, *Proceedings of the STEM Workforce Conference*. Norfolk, VA. November 15, 2019.

Johnson, J., Bothel, T., & Smith, K. "Maritime Engineering Design Challenges". *Proceedings of the 2019 M&S Leadership Summit*, Norfolk, VA, February 25, 2019.

STUDENT MENTORING

Dissertation

Rafi, Soule- PhD Systems Engineering, Old Dominion University

Research Assistant and Internship Supervision

Ashley Buczkowsi- Undergraduate Research Intern, Old Dominion University Game Design, Fall 2024 - Present

Austin Connolly-

Graduate Research Assistant, Modeling and Simulation Engineering, Fall 2024 - Present
Undergraduate Research Intern, Old Dominion University Game Design Concentration, Summer 2024

Noah Boucher- Undergraduate Research Intern, Old Dominion University Game Design Concentration, Summer 2024

Zabia Evans- Graduate Research Assistant, Speech Language and Pathology M.S. Concentration, Fall 2023- Fall 2024

Prathyusha Keerthi- Graduate Research Assistant, Computer Science M.S. Concentration, Summer 2023- Fall 2023

Devon Nelson- Undergraduate Research Assistant, Game Design Concentration, Spring-Summer-Fall 2023

Christian Lamm- Graduate Research Assistant, Engineering Management M.S. Concentration, Fall 2023; Undergraduate Research Assistant, Game Design Concentration, Spring-Summer 2023

Devon Walker- Graduate Research Assistant, Modeling and Simulation Engineering, M.S. Concentration, Fall 2023; Undergraduate Research Assistant, Game Design Concentration, Spring-Summer 2023

Service to the Community

September 2021 – July 2023
Regional Coordinator Mid-Atlantic Region: Marine Advanced Technology Education
Responsibilities included organizing the annual competition, team support, ROV training and workshops for teams and volunteers, volunteer management, outreach/promotion of the event, and overseeing judging and evaluation of pool mission, engineering presentations, and poster presentations on the day of the competition. ODU-VMASC

June 2021- Present
High School Internship Coordinator: Hoffler Creek Preserve
Aided in the development and coordination of a STEM ecological internship for high school students in the summer at ODU-VMASC.

May 2021- Present
SHE Can STEM/Butterfly Village: SHE Can STEM Ambassador
Provide expertise and input on development of various STEM programming and outreach for underserved and underrepresented females in STEM professions in grades K-12 grades. ODU-VMASC

April 2021- Present
ODU Mathematics Festival and Computer Science Festival & TAME Math

Served on Math Festival executive board to help create, coordinate, and develop programming for annual conference. ODU-VMASC

July 2019- 2024
STARBASE, Portsmouth Public Schools
Executive Board Member
STEM pathways program for all 4th- 6th grade students within Portsmouth Public Schools. Assist in STEM curriculum review, marketing, funding, and service outreach/programming. Served as executive board member. Development Expansion & Continuity Committee member. STARBASE is the only public/private STARBASE partnership in the United States.

Community Events

- Hiring GEN Z- ODU OERI, hosted by Hampton Roads Workforce Council, 4/2- K12 Academia, Higher Education, Industry
  - Coordinated event at ODU OERI
  - Volunteered for event setup

Outreach

- IMTS Conference, Chicago Illinois- 9/9 – 9/14
  - Volunteered as partner in booth with Blue Forge Alliance, ATDM, General Dynamics/Electric Boat, HRWC
  - Showcased maritime STEM activities to over 5,000 students focusing on simulation-based technologies
- Department of Defense Education Activity- Ecosystems of Partnership Event- ODU OERI, 11/15/2024
  - Coordinated 150 K12-Higher Education teachers and community partners from all over the country to a STEM event at ODU OERI
  - Showcased project work, STEM outreach, and resources
- Digital Ship Competition- ODU OERI (3/15/2025)- High School Event
  - Assisted with coordination of the event, development of maritime activities, and running logistics on the day of
- Virginia Ship Repair Foundation's Digital Innovation Challenge- Nauticus, 3/20- Middle School Event
  - Assisted partners as scorekeeper
  - Volunteered to run maritime activities at booth
- First Nationals Competition, Houston, Texas- 4/15-4/18
  - Volunteered as partner in booth with Blue Forge Alliance, ATDM, General Dynamics/Electric Boat, HRWC, HII-NNS
  - Showcased maritime STEM activities to over 7,500 students focusing on simulation-based technologies