JOHN SHULL

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EDUCATION

D.Eng STUDENT ENGINEERING. MODELING & SIMULATION, ***September 2014 - Current***
Old Dominion University, Norfolk, VA
Augmented/Mixed/Virtual Reality, User Design Theory in AR, Serious Games, & Data Visualization.

MASTERS OF ENGINEERING, MODELING & SIMULATION, ***Completed August 2014***
Old Dominion University, Norfolk, VA
Emphasis in Visualization and Agent Based Modeling

BACHELORS OF SCIENCE IN BUSINESS ADMINISTRATION, ***Completed December 2011***
Old Dominion University, Norfolk, VA
Dual Major: Marketing and Decision Sciences

PROFESSIONAL EXPERIENCE

LEAD PROJECT SCIENTIST — **NOV 2020-CURRENT**
Virginia Modeling Analysis Simulation Center (VMASC) , Old Dominion University, Suffolk, VA

RESPONSIBILITIES

- Facilitate extended reality (XR) development within the paradigms of modeling and simulation
- Lead modeling, simulation and visualization research teams by creating the research team group, setting milestones and deliverable dates, and ensuring that the team works efficiently and effectively as a cohesive unit.
- Lead technical teams to develop research-to-enterprise solutions dealing with interactive comprehensive visualization systems, physical to digital efforts, user design theory in and around spatial systems, and leading efforts in immediate turn-key use cases within the XR environment
- Perform individual research (applied, basic, customer, and market) based on requirements established by Principal Investigators, VMASC Leadership, and/or from interaction with project customers, clients, and partners.
- Contribute to open source policies (when applicable), help facilitate an agile framework for better project management and workflow efficiencies - this includes the adoption of inclusive design protocols - as well as utilizing software technologies to help ensure research project success
- Conduct In-progress review (IPR) meetings with government, academic and industry sponsors by scheduling the meetings, sending meeting announcements, setting meeting agenda, developing the presentation and facilitating the meeting.
- Help assist the SEA Lab manager in the development of proof of concept applications for use to demonstrate core VMASC strengths

PROJECTS

- 5G Warehouse Operations and Extended Reality
  - Lead technical developer for building an interactive, networked, extended reality experience to help demonstrate the capabilities of 5G infrastructure and warehouse facility operations.
  - Software architecture and deployment model across iOS, HoloLens 2, and Windows.
  - Responsible for leading a team within a virtual video production pipeline to help generate companion videos that used existing assets from the interactive experience.

- Virginia Philosophy Virtual Reality Lab Grant HAA-277270-21 funded by the NEH
  - The primary investigator is Dr. Andrew Kissel with the Philosophy and Religious Studies Program
  - Co-PI on the NEH funded project
  - The primary developer and intellectual property partner for a new VR application tied to philosophical moral dilemmas
  - Architect for applying Open Science Frameworks towards the project
  - Architect for establishing and distributing Packaged content via Unity Package manager
  - Lead Team member managing open source repository for the remaining future effort

- Unreal Mega Grant and Digital Shipbuilding STEM
  - Designed and architect educational interactive software for learning about ship building jobs and work-force development opportunities
  - Building open source libraries for educational use cases
  - Building open source libraries for event management use cases
  - Building data oriented design libraries for procedural information generation
  - Working with Epic and the Unreal 5 Engine on a mixed reality experience tied to the history of shipbuilding

- 5G Tele-Mentoring
  - Custom application to have a remote trainer participate with a on-site trainee over a volumetric telepresence session.
  - Lead technical developer for integrating real-time volumetric capture software/hardware that is then passed off to the 5G team
  - Working with COTS solutions DepthKit Studios within the space of real-time mesh volumetric capture

- VSHIP Trainer
  - Technical lead brought in to salvage a project
  - Helped coordinate and direct an immediate solution to solve an organizational failure
  - Helped secure and deliver on phase 1 of the project
  - Helped secure future phase 2 project funds
  - Helped hand-off the project to the next team

- Virginia Department of Emergency Management COVID Response Team
  - A technical lead on helping ODU/VMASC work with the Virginia Department of Health to establish better internal modeling to help VDH team members work through possible shot-in-arm scenarios
  - Created various internal tools to scrape public data services
  - Created various internal tools to clean and combine data
  - Provided technical support and data to research faculty who built real-time daily models for public awareness

OCT 2017–
NOV 2020

SENIOR PROJECT SCIENTIST
Virginia Modeling Analysis Simulation Center (VMASC) , Old Dominion University, Suffolk, VA

RESPONSIBILITIES

- Provide technical solutions to research faculty at VMASC
- Facilitate extended reality (XR) development within the paradigms of modeling and simulation
- Lead technical teams to develop research-to-enterprise solutions dealing with interactive comprehensive visualization systems, physical to digital efforts, user design theory in and around spatial systems, and leading efforts in immediate turn-key use cases within the XR environment

- Contribute to open source policies (when applicable), help facilitate an agile framework for better project management and workflow efficiencies - this includes the adoption of inclusive design protocols - as well as utilizing software technologies to help ensure research project success
- Help develop project protocols that abide by University practices, new security requirements, updates to internal project methodology
- Migrating older research projects to cloud enabled capable solutions
- Assist in any/all VMASC activities, projects, and personnel that involve XR capabilities.
- Help facilitate VMASC STEAM outreach events
- Help assist the SEA Lab manager in the development of proof of concept applications for use to demonstrate core VMASC strengths

PROJECTS

- Narrative Modeling: Situational Influence Spatial Modeling Tool
    - The primary investigator is Dr. Beth Cardier & Dr. Saikou Diallo
    - VMASC Internally funded project
    - The primary developer and intellectual property partner for a new extended reality (XR) narrative conceptual modeling software.
    - Working directly with PI's to build user design into new XR software that will function across devices, spatial location, and the cloud

- Tele-Health Etiquette Trainer
    - The primary investigator funded via a VMASC Internal research and development grant
    - Worked with ODU school of nursing to evaluate and work towards a proof of concept real-time video streaming application that uses face tracking, eye data, and natural language processing to help train and evaluate a simple tele-health visit.
    - Lead developer on building out a software application that used IBM Watson chat services to develop an interactive real-time chat that followed along with a trainee over a real-time video streaming application.
    - The application focused on using Apple hardware with integration of real-time facial features being captured to help identify data streams that could be utilized later for an overall evaluation of said tele-health experience
- Digital Shipbuilding: Grant 51011152017130742 funded by the Go-Virginia Foundation.
    - The primary investigator for the project is Dr. Jennifer Michaeli
    - Part of a team responsible for overseeing the setup and equipment purchases for an extended reality (XR) IoT lab at VMASC
    - Part of a team responsible for maintaining and running of the VMASC DigitalShipbuilding Lab
    - Lead Developer for various applications and proof of concept work for numerous community outreach and education events
    - Helped establish a XR lab at the William & Mary Applied Research Center
    - Part of a team responsible for the initial setup of a community outreach center, makerspace, and workforce development hub for the city of Newport News - the Brooks Crossing Center - opening in August 2019

- STEAM on Spectrum: a biannual community outreach event for families with Autism.
    - Lead developer on various interactive experiences for a wide range of children.
    - Responsible for helping coordinate the events as well as overseeing the events themselves

- Will the Internet of Things Be Inclusive? IRBNet ID: 1189999-11
    - The primary investigator for the project is Dr. Krzysztof Rechowicz
    - Lead developer on an Amazon Web Services Alexa Skill that was designed to

collect data to serve two main goals.
    - Adapt an IoT device to help children with Autism Spectrum Disorder (ASD) that are between the ages of 2-14 improve their verbal and echoic communication skills.
    - Evaluate whether such tools can significantly improve their verbal echoic communication skills
  - Responsible for curating, analyzing, and processing the research results.
  - Managed the relationship with the partner organization in which the study was performed at - the Mea'Alofa Autism Support Center located in Suffolk Virginia

- VR Artist Study: IRBNet ID: 1093716-19-137
  - The primary investigator for the project is Dr. Krzysztof Rechowicz
  - Helped in facilitating an IRB study involving 15 artists and using virtual reality software
    - Supervised 15 artists through a controlled VR software portion of the live study
    - Developed custom visualization solutions of the motion data captured through the study and then provided that solution as a VR visual analysis solution to the researchers

- Catalhoyuk Digital Senses VR Experience
  - Developer on upgrading an existing experience to include tetherless VR.
  - Full sensory experience - using custom olfactory emitters, infrared head, custom props, and motion data to provide an interactive engaging VR experience.
  - Users were transported back in time 6000 years to Catalhoyuk - a Western Turkey city - in which users are able to explore a recreation of a standard living quarters

ACADEMIC EXPERIENCE

GRADUATE RESEARCH ASSISTANT **SEP 2014– SEP 2017**
MSVE Department, Old Dominion University, Norfolk, VA

RESPONSIBILITIES

- Taught ENG 110 courses every Fall Session
- Department tutor
- Facilitated the development and running of ODU College of Engineering Booths at select local and international conferences
- Responsible for maintaining and developing in-lab demonstrations for interactive augmented/virtual reality applications
- Help create and maintain department social media accounts
- Collaborated with English Language Center for on-campus enrichment activities and help establish a cross-departmental relationship

PROJECTS

- Stern2STEM: Grant 11899718 funded by the Office of Naval Research (ONR)
  - A pilot program conducted by ODU in the College of Engineering.
  - Project is designed around students who have served in the military and providing them successful support through their degree program completion
  - Lead Unity developer for serious game applications
  - Lead content and artist developer
  - MAVEN: a Windows serious game application focused on pre-calculus concepts
  - CAPTIVATE: an Android and iOS mobile application focused on calculus, physics, and chemistry concepts.
- Augmented Reality Research: Grant # ODU-04-01 Sub Award # 2A92-OD
  - A feasibility project in developing protocols for initial work in developing an augmented reality application for use in an industrial complex
  - Project was co-sponsored with NASA Langley's Compressor Station
  - Graduate student responsible for all major development work
  - Reverse engineering external mesh from lidar point cloud data for a 1960's

compressor
    - Identifying current market software for automatic mesh generation
- Augmented Reality Research: Contract # NNL 13AA08B Subcontract # T13-6500-ODU Task Order # 6587-OD
    - A continuation of research with NASA Langley and the Compressor Station to build and develop a near-real time augmented reality data visualization of sensor data for mission critical equipment
    - The main developer of an augmented reality application for distribution on the Microsoft HoloLens
    - Development of a WCF application for local data distribution and communication over a personal area bluetooth network
    - All UX and UI content development for application.

STUDENT CHAIR- STUDENT CAPSTONE CONFERENCE **APR 2012– APR 2017**
MSVE Department, Old Dominion University, Norfolk, VA

RESPONSIBILITIES
- Student chair appointed in the coordination and development of the Student Capstone Conference
- Directly assist the MSVE graduate program director
- In charge of all digital media, marketing, website development, student coordination, conference handbook publication, and track chair coordination.
- Responsible for creating the yearly proceedings as well as curating the previous proceedings

AWARDS
- Recognized for excellent service at the 2017 Student Capstone Conference

GRADUATE RESEARCH ASSISTANT **FEB 2013– AUG 2013**
MSVE Department, & Old Dominion Research Foundation, Norfolk, VA

RESPONSIBILITIES
- Worked on the development of a field study involving transportation departments of the City of Virginia Beach and City of Suffolk
- Project focused on research associated with Dr.ManWo Ng
- Funded project through the Virginia Innovation Partnership associated with the U.S. Department of Commerce i6 Challenge

PRIVATE EXPERIENCE

CONSULTANT **MAR 2011– AUG 2014**
Rockwell Restaurant LLC, Norfolk, VA

RESPONSIBILITIES
- Assisted business owner in all aspects of small business development
- Explored various projects related to decision factors for target customers
- Designed and implemented a back office system for maintaining daily financial records with inventory management systems.
- Development of forecasting systems for seasonal inventory ordering and procurement Taught ESL courses in all skill areas and levels in an IEP

SELECTED ACCOMPLISHMENTS
- Within the first year an immediate reduction in general costs of goods from on average of 45% to 32% with a direct increase to take home profits

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AWARDS

GENE NEWMAN AWARD
Best overall paper for the 2016 Student Capstone Conference
An annual student award established by Mike McGinnis in 2007 for outstanding overall best presentation, best paper, and research contribution

OLD DOMINION UNIVERSITY INFOGRAPHICS COMPETITION
Runner-up for the 2013 ODU Infographics Competition

Recognized for outstanding data mining and data management techniques
A competition held by Dr. Michele Weigle of the Computer Science Department

ODU ENGINEERING EXCELLENCE AWARD
Recognized graduate student of the year for 2016 for the MSVE department
An annual awards banquet for the Batton College of Engineering where they celebrate and recognize faculty, staff and students for the previous year

VOLUNTEER EXPERIENCE

VIDEO GAME DESIGN AND DEVELOPMENT CLUB **SEP 2016-MAY 2017**
Leadership & Student Involvement, Old Dominion University, Norfolk, VA
Help assist and mentorship of a student organization. Assisted in hosting virtual reality tutorials and guided workshops for student officers.

PUBLICATIONS

Cardier, B., **Shull, J.,** Nielsen, A., Diallo, S., Casa, N., Lundberg, P., Sanford, L. D., Ciavarra, R., Goranson, T. "A Narrative Modeling Platform: Representing the Comprehension of Novelty in Open World Systems" a book chapter in *Human-Machine Shared Contexts*. Lawless, W., Mittu, & R., Sofge, D. (Eds.) Elsevier (2020)

Collins, A., **Shull, J**., & Thaviphoke, Y. "The need for simple educational case-studies to show the benefit of soft operations research to real-world problems." International Journal of System of Systems Engineering 9, Vol. 9, no. 1 (2019): 75-97.

Rechowicz, K. J., Diallo, S. Y., Garcia, H. M., **Shull, J.,** B., & Cvijetic, B. "Making digital sense [s]: fundamentals." In Proceedings of the Annual Simulation Symposium (Article No. 13). Society for Computer Simulation International (2018). ISBN: 978-1-5108-6014-8

Yang, H., Shen, Y., Hasan, M., Perez, D., **Shull, J.** (2018) A Framework for Interactive M3 Visualization of Microscopic Traffic Simulation. Transportation Research Record. 2018;2672(44):62-71. doi:10.1177/0361198118787088

Smith, K., **Shull, J.,** Shen, Y., Dean, A., & Heaney, P. "A framework for designing smarter serious games." A book chapter in *Smart Universities.* Uskov, V., Bakken, J., Howlett, R., Jain, L. (Eds.) Springer International Publishing (2018): 263-294. Doi: 10.1007/978-3-319-59454-5_9

Smith, K., **Shull, J.**, Dean, A., Shen, Y., & Michaeli, J. (2016) "SIGMA: A software framework for integrating advanced mathematical capabilities in serious game development." *Advances in Engineering Software* 100 (2016): 319-325

CONFERENCE PRESENTATIONS

Cardier, B., Goranson, T., Saikou, D., **Shull, J.**, Casas, N., Nielsen, A., Lundberg, P., Sanford, L. D., Ciavarra, R., A Narrative Modeling Platform: Modeling Implicit Influence Among Contexts. AAAI Spring Symposium on Computational Context: Autonomous machines and human awareness: User interventions, intuition and mutually constructed context.

Smith, K., Johnson, J., Cvijetic, B., Ralph, C., **Shull, J.** (2022) Increasing Student Engagement in STEM through Career Connected Simulations and Games. Pre-College Education Division ASEE (accepted)

Smith, K., **Shull, J**., Shen, Y., Dean, A., & Michaeli, J. (2017) Overcoming challenges in educational STEM game design and development. Winter Simulation Conference Las Vegas, NV (accepted)

Smith, K., **Shull, J**., Shen, Y., Dean, A., Heaney, P., & Michaeli, J. (2017) Overview of game and content design for a mobile game that will prepare students in calculus and physics prerequisites to the

engineering curriculum. ASEE Annual Conference & Exposition, Columbus OH

Smith, K., Shen, Y., **Shull, J.**, Dean, A., & Michaeli, J. (2016) A toolkit for presenting advanced mathematics in serious games. Presented at IEEE SouthEastCon, Norfolk VA

Obeid, M., & **Shull, J.**, (2013). West Nile Virus a Systems Dynamics Investigation in Dallas County, TX. Winter Simulation Conference, Washington, DC.

INVITED PRESENTATIONS

The Idea Fest Hosted by Booz Allen Hamilton (2016) Invited presenter at the for the Ignite sessions. Presentation title: 'Sensing technologies and how they are changing everything we do.' Presented March 5, 2016 at Town Point Club Norfolk, VA

PUBLISHED PROCEEDINGS

Smith, K., **Shull, J.**, Shen, Y., Dean, A., & Michaeli, J. (2017) Overcoming challenges in educational STEM game design and development. Winter Simulation Conference Proceedings WSC 2017 (accepted)

Heaney, P., Smith, K., **Shull, J.,** Eller, B., Dean, A., Shen, Y., & Michaeli, J. (2017) Stern2STEM: Implementation of a feed forward model for educational game development. Proceedings of ASNE Day 2017 Technology, Systems, & Ships.

Obeid, M., & **Shull, J.** (2013). West Nile Virus a Systems Dynamics Investigation in Dallas County, TX. Winter Simulation Conference Proceedings WSC 2013 (F.182)

POSTERS

Shull, J., & Smith, K. (2016). A Toolkit for presenting advanced mathematics in serious gaming. Presented at the American Society of Naval Engineers (ASNE) annual conference 2016

LOCAL CONFERENCES

Smith, K., **Shull, J.**, Shen, Y., Dean, A., & Michaeli, J. CAPTIVATE: Employing classic game mechanics in a serious STEM game. Presented in the gaming and visualization track at the 2017 Student Capstone Conference Norfolk, VA (*Best Presentation*)

Shull, J. (2016). An agent_zero approach for Chicago police complaints. Presented in the Agent Based Modeling Track at the 2016 Student Capstone Conference Norfolk, VA *(Best Paper / Best Presentation)*

Shull, J., & Shen, Y. (2016). Visualizing and reverse engineering large industrial equipment using lidar point clouds. Presented in the gaming and visualization track at the 2016 Student Capstone Conference Norfolk, VA

Smith, K., **Shull, J.**, Dean, A., Shen, Y., & Michaeli, J. (2016) MAVEN: A serious mathematics game for veteran education. Presented in the Visualization and Gaming track at the 2016 Student Capstone Conference Norfolk, VA

TECHNOLOGY / SOFTWARE

Cloud Services| AWS*: IAM,Cognito, S3, & DynamoDB*. Azure: *World Anchors, Blob Storage, CosmosDB, Computer Vision, Speech Services, Azure Kinect Services*
Game Engines | *Unity3D*
Simulation Software| *Arena, Anylogic, NetLogo 5, Improbable SpatialOS*
3D Modeling| *Sketchup, GeoMagic Design X, Solidworks, & AutoDesk Inventor*
Web & Multimedia| *Adobe Creative Cloud - Illustrator, Photoshop, Premiere- Google Analytics, Google Maps API, Survey Monkey, GoDaddy hosting services, AWS cloud support, Wacom devices, and Wordpress blog studios.*
Microsoft Office | *Word, PowerPoint, Excel, Office, Publisher, Outlook*
Course Management Systems | *Blackboard, CourseSites, Google Classroom, Canvas*
Google Applications | *Docs, Sheets, Slides, Forms, Classroom*
Audio Software | *Audacity, Praat, & Adobe Audition*

Screencasting | *Camtasia*
Social Media | *Facebook, Twitter, Instagram, Pinterest, Reddit, SnapChat, LinkedIn , Slack*
Virtual Communication | *Skype, Google Hangouts, Windows Live, Lync, Zoom, MS Teams*
Extended Reality | *MRTK, ARKit, ARCore, HoloLens, all Windows based HMD's, Azure Anchoring Services, Oculus/Meta SDK, SteamVR, OpenVR, OpenXR*

DEVELOPMENT LANGUAGE

Primary developer language is C# and the .NET framework also familiar with C++, CSS, Cg, Grbl, HTML-5, Java, Javascript, OpenGL, Python, SQL, and various API's associated with AR/VR development work: Vuforia, OpenVR, OpenXR, MRTK 2.7.2, ARKit, ARCore, Microsoft HoloLens, SteamVR, VRTK, Unity 3D

PROFESSIONAL MEMBERSHIPS & CERTIFICATIONS

International Game Developer Association, Society for Modeling & Simulation Student Member, American Society of Naval Engineers Student Member, Member of the Norfolk PixelFest Developer Group & FAA Small UAS Certificate of Registration# FA3HHL9APE

RESEARCH INTERESTS

Research of M&S application in areas of visualization, augmented/mixed/virtual reality, user design theory in augmented reality, game design in educational environments, big data representation in mixed reality, agent based modeling of complex adaptive systems, and taking XR work into the field - working with the Virginia Institute of Marine Science to explore XR use cases within harsh environments.

CONTINUING EDUCATION

UDACITY SELF DRIVING CAR PROGRAM, *August 2017 - December 2017*
Online Degree Program(s)
- Computer Vision and Deep Learning - *currently enrolled in this section*
- Sensor Fusion, Localization, and Control
- Path Planning, Concentrations, and Systems

UDACITY DEEP REINFORCEMENT LEARNING PROGRAM, *April 2019- August 2019*
Online Degree Program(s)
- Introduction to Deep Reinforcement Learning
- Value-Based & Policy Based Methods, Multi-Agent Reinforcement Learning

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REFERENCES

Dr. Saikou Diallo
Chief Scientist & Director of Internal Research and Development
Virginia Modeling Analysis Simulation Center
Old Dominion University
(757) 638-6320
sdiallo@odu.edu

Dr. Jessica Johnson
Director for STEM & Student Engagement Co-Director
Digital Ship Lab Curriculum Coordinator
(757) 635-9973
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Dr. Sachin Shetty
Executive Director Center for Secure and Intelligent Critical Systems
Old Dominion University
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