

## Service

Service is an important component of our profession and an activity that grounds us in the local community, the university, and the academic community at large. Locally, I have had the satisfaction of helping the Portsmouth Fire, Rescue and Emergency Medical Services (PFRES) Department prepare their annual report and formulate operational and clinical care evaluation measures. The objective of this partnership was to help the department better understand their capabilities and shortcomings so that their training can be targeted to improve their overall effectiveness, especially their response time to emergency calls. This work has informed my own research by making me more aware of how best to develop research artifacts that are directly actionable for decision makers in the wild.

Most recently, I developed a model at the city and county level of Virginia, that is updated daily, that gives a short-term forecast for the total number of COVID-19 cases, COVID-19 vaccines administered and supplied. The tool gives a 7-day forecast for the number of COVID-19 cases and a 21-day forecast for the COVID-19 vaccines administered and supplied. This forecast is updated daily. In addition, it gives provides a forecast for the city/county about the age range of individuals with COVID-19 and what their case outcomes are expected to be. Finally, it attempts to identify tweets from individuals within the city/county that are reporting having COVID-19. The tool is designed to be as transparent as possible. For each forecast or piece of insight it provides it tries to describe the methodology behind how it came to that prediction in a straightforward way. It is available at: <https://vmasc.shinyapps.io/va-county-covid-forecast/>. Since it has been deployed it has been used by the Virginia Department of Health, the Virginia Department of Emergency Management and has over 1,000 different unique users from the public across 75 different cities or counties within Virginia. In addition, the model has been covered by television (Norfolk 10 News, 13 News Now) and print (ODU News, ODU Alumni magazine, Williamsburg Yorktown Daily and Virginia Pilot). Finally, I presented the platform at the COVID19 - ODU Public Health Talk.

Also, in 2017 I became a regular participant in the Hampton Roads Pedestrian and Bicycle Advisory Committee (Hampton Roads PABAC) meetings. Using data provided by the Virginia Department of Transportation (VDOT) and data collected from the Strava running and cycling application I was able to identify those areas where adding bicycle and pedestrian paths would improve health outcomes the most in the Hampton Roads region. I presented the results to decision makers and stakeholders within VDOT and the Hampton Roads Transportation Planning Organization (HRTPO). After each presentation I worked with them to incorporate their feedback into the analysis. Ultimately, I submitted my work to them at the end of 2017 to inform their 2018 planning and provided our findings to the public available at: <https://rgore-vmasc.shinyapps.io/norfolk-bike-ped/>.

In service to the university, I have participated in the search/selection committees of three research faculty positions, and three project scientist positions at the Hampton Roads Biomedical Research Center (HRBRC) associated with ODU. In addition I have served on the search/selection committees for the ODU Information Technology Services High Performance Computing (ITS/HPC) computational scientist and three VMASC project scientists. In addition, I serve on the ODU HPC committee, and am a regular participant at ODU's Annual Research Computing Day. In addition, in 2018 I collaborated with colleagues at Old Dominion University to contribute to the State of the Region: Hampton Roads Report. I have also represented ODU and VMASC during visits from esteemed guests including the governor, mayors, and US Joint Staff College high-ranking military officials. These visits provide opportunities to give guests from the wider community of ODU supporters a chance to test the systems we have built in my lab and challenge our approach to solving pressing research problems in M&S and other application areas.

I continue to serve the simulation community at large not only by peer-reviewing for journals and conferences, but by also participating in conference organization. I have served as the Tutorial chair for the Society for Modeling & Simulation International 2016 Spring Simulation Conference. This was a particularly rewarding experience because I was able to curate a selection of technology tutorials for the conference audience that I thought would enhance the future research of conferences attendees. I have been able to see the effect of the tutorials on the research papers submitted to the conference as a member of the program committee in subsequent years (2017-2020). Ultimately, it was a great responsibility that generated many connections and the opportunity to represent ODU, VMASC, and promote the work of colleagues in the community.

While my research focuses predominantly on the data science and predictive analytics aspects of M&S, I also am firmly committed to M&S that contributes to the advancement of humanity and solving real-world problems. One of my research endeavors uses M&S principles and methodologies collaboratively with social science research on refugee migration. Together with social science colleagues from across the world, we have challenged existing theories, and explained the subtle situations of Syrian refugees in Turkey and Amsterdam to policymakers. In July of 2018 our work was originally presented at the Workshop on Humanitarian Logistics for Refugees in Amsterdam and then in January of 2019 a more refined version of our approach was recognized as the most important piece of refugee research focusing on safety and security at The Data for Refugees Challenge Workshop. My role in this work was not only to conduct analysis and build simulations, but also infuse an analytical way of thinking that bridges the gap between academics researching in the field, policymakers, and the communities they serve. The workshop helped to obtain reliable data, identify trustworthy information, and generally combat the rampant rumors that ignite xenophobic sentiment and physical violence towards refugees. Another research endeavor combined demographic information, and geo-spatial information along with coarse and fine-grained anonymized cellphone records from Senegal to identify those areas within the country that would benefit the most having hospitals be built. The work identified a minimal set of hospitals that would drastically reduce the number of deaths in the country due stroke and heart attack. This work was awarded the Practical Application prize at the 2015 Data for Development Workshop and has influenced the placement of several hospitals in Senegal since its publication.

### **University Service**

- ☐ Member of ODU High Performance Computing Committee
- ☐ ODU / HRBRC research faculty search committees (three)
- ☐ ODU / HRBRC project scientist search committees (three)
- ☐ ODU HPC research scientist search committee
- ☐ VMASC/ODU project scientist search committees (three)
- ☐ Served on 3 ODU graduate student PhD dissertation committees (CMSE & CS Depts.)
- ☐ Represented Old Dominion University at the 2014 and 2017 Annual Capitol Hill Modeling & Simulation Expo – presented research from Old Dominion University to house of representative members, senators and staff aides.

### **Professional Service**

#### ***Publication Peer-Reviewer***

- ☐ Journal of Defense Modeling and Simulation
- ☐ Simulation
- ☐ Simulation Modeling and Practice

- ☐ The Journal of Artificial Societies and Social Simulation
- ☐ ACM Transactions on Modeling and Simulation
- ☐ IEEE Transactions on Knowledge and Data Engineering
- ☐ Journal of Communications and Network
- ☐ Journal of Medical Internet Research
- ☐ Journal of Participatory Medicine
- ☐ Social Science Research
- ☐ Simulation Modelling Practice and Theory
- ☐ Heliyon
- ☐ AI & Society
- ☐ Journal of Information Security and Applications
- ☐ Nonprofit and Voluntary Sector Quarterly
- ☐ Electronics
- ☐ Applied Science

### ***Conference Organizing***

- ☐ Member of Program Committee - 2014 - 2020 SCS Spring Simulation Conference.
- ☐ Member of Program Committee - 2014 - 2020 SCS Winter Simulation Conference.
- ☐ Member of Program Committee – 2014, 2015, 2018 MODSIM World Conference.
- ☐ Tutorial Chair – 2016 SCS Spring Simulation Conference, Pasadena, CA

### ***Professional Membership***

- ☐ Association for Computing Machinery (ACM)
- ☐ Society for Modeling and Simulation International (SCS)

### ***Community Service***

- ☐ Participated in the analysis and writeup of State of the Region: Hampton Roads 2018
- ☐ Work on understanding health effects of bicycle and pedestrian paths in Hampton Roads area with two presentations given to advocates and decision makers (2017).
- ☐ Created data analytics dashboard and annual reporting capability for Portsmouth Fire, Rescue and Emergency Services related to performance evaluation (2015).
- ☐ Created automated tool to create catalog entries of all publications from the Journal of Defense Modeling and Simulation. The created catalog entries were ingested into the Defense Modeling and Simulation Coordination Office (DMSCO) simulation library so that they could be searched and retrieved more easily by interested parties (2015).