Dear Researchers,

We have a lot of exciting developments to anticipate in this academic year!

First of all, ODU won a $1.5M Major Research Instrumentation grant from the National Science Foundation (NSF) to build our next-generation cluster. We have also secured $500,000 to develop a HPC-focused training program for cybersecurity students. And a new Software Carpentry workshop will teach basic computational skills to researchers and students.

We feature some researchers (Dr. Khan Iftekharuddin, Dr. Kent Carpenter, and Dr. Dan Barshis) and their recent works in this edition. We hope that you enjoy reading it!

We want to hear from you: Please email us at hpc@odu.edu.

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2018 Research Computing Day

Friday, October 12, 1:30 to 4:30 p.m.
MSVE Auditorium (ECSB first floor)

This annual event brings the ODU research community together and showcases the computational and data-intensive research performed by our own faculty, researchers, and students. Keynote speaker Dr. Sunita Dodani is director of the Healthcare Analytics and Delivery Science Institute at EVMS. Other activities include researchers’ lightning talks and a poster session.


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ODU Researchers Win $2 Million NSF Grant to Build a Next-Gen Computational Cluster

Congratulations to Dr. Hongyi Wu, Dr. Jingwei Huang, Dr. Masha Sosonkina, Dr. Khan Iftekharuddin, and Dr. Nikos Chrisochoides for winning a $1.5M NSF grant, with additional University matching funds of $645K, for the next-generation shared computational cluster at ODU.

The new cluster will include the latest generation microprocessor architecture (Intel Xeon Skylake), high-memory nodes (>= 384 GB/node), and latest NVIDIA V100 graphics processors specifically designed for deep learning. The new cluster will have a high-performance, low-latency Infiniband fabric capable of data transfer speeds of 100 Gbps. Built using OpenStack technology, this cluster will enable flexible configurations to satisfy researchers’ needs beyond traditional HPC. Custom environments such as virtual machines, instructional clusters, and data-analytics-as-a-service will be possible with the new cluster.

Once completed, ODU researchers will carry out cutting-edge, compute- and data-intensive research involving deep learning, advanced modeling, and big data analytics in fields such as cybersecurity, biomedical and aerospace engineering, resiliency, and many more.

Researcher’s profile: Dr. Khan Iftekharuddin

The ODU Vision Lab took first place in the 2017 BraTS (Brain Tumor Segmentation) Challenge competition for the analysis of brain tumor images. The Vision Lab, led by Dr. Khan Iftekharuddin in the department of Electrical and Computer Engineering, aims to develop novel theory, algorithms, and real-time implementations in biomedical, autonomous robotics, human- and machine-centric recognition, and environment & geoscience applications based on the disciplines of computer vision, signal/image processing and machine learning.

The Vision Lab makes extensive use of the Turing cluster for their computationally intensive workloads. Turing's high memory nodes and multi-core CPU nodes, in addition to the GPU nodes, provide the horsepower necessary for the machine learning and deep learning models.

For the brain tumor segmentation project, the Vision Lab researchers use random forest machine learning and deep learning to pull meaningful features from MRI data to identify abnormal brain tissues.

Thank you Dr. Khan for your continued support of the research computing environment and contribution to research excellence at ODU.
ODU Biologists Used Turing Cluster to Teach Bioinformatics Workshop in the Philippines

Two ODU marine biologists and Turing users, Kent Carpenter and Dan Barshis, recently received a $4.6-million, five-year Partnership for International Research and Education (PIRE) funding from NSF to conduct a large-scale study in the Philippines on the changes in marine genetic diversity happening over the past century as a result of human fishing activities and other causes such as habitat loss.

This summer (June 19 to July 3), the PIRE team held the ‘Omics and Bioinformatics workshop at the Silliman University’s Mariano and Lina Lao Activity Center and Technology Laboratory, the Philippines. There were 33 participants from the U.S. and the Philippines. The workshop aims to build the capacity of Philippine researchers to carry out state-of-the-art biology research. “This is the third workshop that we’ve run in the region and a few [local] labs are full-steam ahead with genomics research projects,” said Barshis. The workshop involved lectures and hands-on training on advanced genomics, molecular ecology, and bioinformatics, using real-world data for population genetic studies. Genomic analyses involve massive amounts of data and computation. ODU Research Computing Services proudly supported this workshop by lending access to Turing supercomputer to the workshop participants in the Philippines. The instructor team was very pleased that they were able to use Turing for the lab sessions. In the past, participants had to employ virtual machines on local workstations for the lab, which posed many limitations. According to Barshis, “It would not have been possible to do all our analyses [this year] using a locally-installed virtual machines, so using Turing was vastly preferable from a teaching standpoint.”

To learn more about the Philippine PIRE project, readers are invited to visit https://sites.wp.odu.edu/PIRE/.

ODU Researchers Awarded $500k NSF Grant to Train Cybersecurity Students with HPC Skills

NSF recently granted a three-year, $500k award to ODU researchers led by Dr. Hongyi “Michael” Wu, Dr. Masha Sosonkina, and Dr. Wirawan Purwanto to develop Data-Enabled Advanced Training Program for Cyber Security Research and Education (“DeapSECURE”). Through DeapSECURE, students will have opportunities to apply big data techniques, machine learning, parallel computing, and crypto-arithmetic on real cybersecurity problems. Materials will be delivered to ODU cybersecurity students through six workshops during the Fall and Spring semesters. A summer institute will train students attending Research Experience for Undergraduate programs and students from nearby community colleges. Hands-on exercises on ODU’s Turing cluster, an online training environment for further study, and rigorous assessment of training processes and outcomes will be integral parts of DeapSECURE.

To learn more, visit Center for Cybersecurity Education & Research’s website: https://www.odu.edu/ccser/. The first workshop begins October 19.

Workshops and trainings

XSEDE Workshops

Monthly XSEDE workshops, taught by instructors from the Pittsburgh Supercomputing Center, emphasize practical parallel programming skills for researchers. Upcoming workshops:

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<tr>
<td>MPI distributed parallel programming</td>
<td>October 2-3</td>
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<tr>
<td>Big Data &amp; Machine Learning</td>
<td>December 4-5</td>
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Space is limited and seats often fill up, so register early! Watch your mailbox or ODU Daily Announcements for more information.

Software Carpentry Workshop

October 25-26

Thanks to funding from South Big Data Hub, we are hosting a Software Carpentry Workshop titled “R for Reproducible Scientific Analysis,” introducing research tools that will empower you to be productive in your work. (https://rbavery.github.io/2018-10-25-odu/)

This year’s workshop is full. We will organize this event again early next year.

Research Computing Services Staff

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<th>Name</th>
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<td>Wirawan Purwanto</td>
<td>Computational Scientist</td>
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<td>Adrian Jones</td>
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