FALL 2020 NEWSLETTER

# COMPUTER SCIENCE

## OLD DOMINION UNVERSITY

## IN THIS ISSUE

Dear Alumni, Students, and Faculty.

Welcome to Computer Science Department's Newsletter.

Along with the rest of the world, we too have done our best to ride the COVID-19 pandemic wave. Our faculty, staff, and students have been very flexible and accommodative to this unprecedented situation. While most classes were taught in synchronous online mode, some classes were offered with the instructor in the classroom. Even these F2F classes had synchronous and asynchronous online sections to accommodate the student's needs. Our system staff has been very helpful in making sure that the faculty were well equipped with PPE equipment, keeping faculty safety as well as the students' safety in mind. We continue to take all measures to keep everyone safe.

We welcome two new faculty members to the department. Dr. Faryaneh Poursardar joined us as a Lecturer and Dr. Fengjiao Wang joined us as an Assistant Professor.

2020 was a great year in terms of our student graduations. 109 BS degrees, 40 MS degrees, and 5 PhD degrees were awarded during 2020. With the additional resources provided through the Commonwealth of Virginia's Technology Transfer Program (TTP), we hope to graduate many more BS students in the coming years.

The department hosted a summer camp for high school students during August 3-14. ThinSat camp was held virtually. It was led by Dr. Sampath Jayarathna from our department along with two faculty members from Mechanical and Aerospace Engineering. It was sponsored by the Virginia Space Grant Consortium.

We congratulate Dr. Jing He, Professor, for receiving a $1.2M renewal grant from NIH along with Dr. Willy Wriggers of the Department of Mechanical and Aerospace Engineering.

For the second consecutive year, the department held the Trick-or-Research Event. It was held on October 27, 2020. Due to the pandemic situation, it was held as a Zoom session. It provided an opportunity for all students to interact with faculty and their PhD students and know different research opportunities available in the department.

With the help of our Industry Advisory Board, we were able to continue our Industry Speaker Series, for the second successive year. In fall 2020 we had, 3 speakers, Mr. Jeremy Yagle (NASA), Mr. Frank Byrum (Spectrum Communications, Inc.), and Dr. Michele Zhou (Juji. Inc.). The Zoom talks attracted a larger audience.

Each one of you may know Ms. Phyllis Woods from the CS office. She has just completed 45 years of service at ODU. Since 1984, she has been with the department. We congratulate her for her wonderful personalized service to each and every one of us.

Finally, let me thank each and every one of you for your support to the department.

Be Safe,

*Ravi Mukkamala*

# MESSAGE FROM THE CHAIR

# NEW FACULTY

### DR. FARYANEH POURSARDAR
*LECTURER*

Dr. Poursardar has joined to Department of Computer Science in Fall 2020. She has a PhD in Computer Science from Texas A&M University. She was a member of the Center for the Study of the Digital Libraries (CSDL). Dr. Poursardar has years of experience in teaching computer science courses, before moving to the area she was teaching at the Computer Science Department at Virginia Tech.

Her research interests are in Computer-Human Information Interaction, Data Science, Machine Learning and Data Mining, Information Retrieval, Digital Libraries, Web Archive, Digital Data Preservation, and Social Computing.
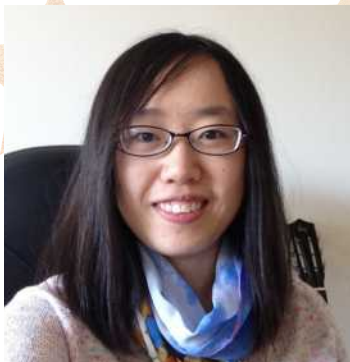
### DR. FENGJIAO WANG
*ASSISTANT PROFESSOR*

Dr. Wang obtained her B.S. in information & computational science from Beihang University, China, in 2010. She then went on to obtain a Ph.D. degree in computer science from the University of Illinois at Chicago in 2017. Her doctoral advisor was Prof. Philip S. Yu. After graduating, she worked as a research scientist with Criteo AI Lab for two years. Before joining the Computer Science Department, here at ODU, Dr. Wang was an applied scientist with Amazon. Her current research focuses on solving emerging challenges for e-commerce, online advertising, privacy protection using machine learning, statistics, and optimization. She has published 12 papers in some of the top conference proceedings in computer science. Dr. Wang's research and papers have received worldwide citations. She has also been invited to be presented in Women in Machine Learning & Data Science (WiMLDS), which is widely covered by media.

# FACULTY / STAFF NEWS

# CONGRATUALATIONS TO OUR GRADUATES

*DUE TO PRIVACY CONCERNS, WE WILL NOT BE PUBLISHING THE NAMES OF OUR GRADUATES*

## Spring 2020

- Bachelor of Science - 62
- Masters of Science - 25

## Summer 2020

- Bachelor of Science - 16
- Masters of Science - 2
- Doctor of Philosophy -4

## Fall 2020

- Bachelor of Science - 31
- Masters of Science - 13
- Doctor of Philosophy - 1

# STUDENT SPOTLIGHT

# STRS: STUDENT THINSAT RESEARCH SUMMER CAMP 2020

*VIRGINIA SPACE GRANT CONSORTIUM INNOVATE PROGRAM GRANT, PI SAMPATH JAYARATHNA*

The Student ThinSat Research Summer (STRS) Camp was held virtually from August 3 – August 14, 2020. The event was sponsored by a Virginia Space Grant Consortium Innovate Program grant with faculty and student instructors from Computer Science and Mechanical and Aerospace Engineering at Old Dominion University.



The STRS camp focused on providing opportunities for integration of coding skills with engineering Standards of Learning for students in a project-based learning environment using ThinSat. The Virginia Commercial Space Flight Authority (Virginia Space), as a part of their commitment to K-12 STEM outreach, has initiated a program called ThinSat, inserting batches of approximately 60 picosatellites into extremely low Earth orbits up to twice a year. ThinSats are launched utilizing the second stage orbit insertion capabilities of their Antares launch system as part of regularly scheduled International Space Station resupply flights.



# FEATURED RESEARCH
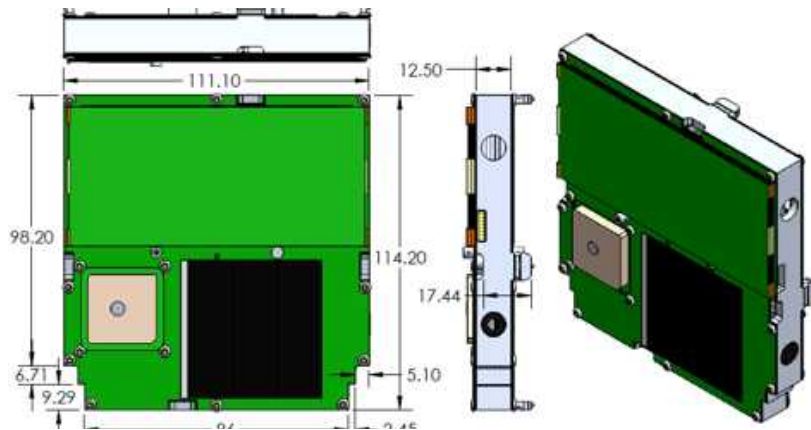
*THINSAT - PICOSATELLITE USED IN THE PROGRAM*
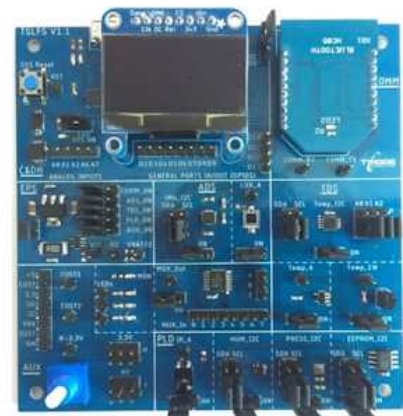
*FTWIGGS SPACE LAB FLATSAT DEVELOPMENT BOARD*

**Faculty and Student Instructors:**

This program was conducted by Dr. Sampath Jayarathna (@OpenMaze) from Computer Science, and Dr. Stacie Ringleb, and Dr. Bob Ash from the Department of Mechanical and Aerospace Engineering, Old Dominion University, who have expertise working with python coding, satellite development, deployment and satellite-based outreach activities. The event also included sessions conducted by Ph.D. student instructors, Bhanuka Mahanama, Yasith Jayawardana and Gavindya Jayawardana from WS-DL group, Department of Computer Science. In support of the sessions, several Ph.D. students (Himarsha Jayanetti, Kritika Garg, and Md Sami Uddin) from the WS-DL research group also volunteered as teaching assistants. In addition, the camp also featured guest speakers from NASA Langley, Microsoft, Virginia Space, and Twiggs Spacelab.

**Student Participants and Demographics:**

The program promotional announcement flyers were shared with public high school in the South Hampton Roads regions, Virginia Beach, Norfolk, Chesapeake, Portsmouth, Suffolk, and multiple Governor's STEM Academy programs (Computer Science).

The STRS camp received 24 applications (16 males, 8 females). With the virtual camp setup, we were able to accommodate all 24 applicants for the inaugural program. At the end of the two weeks' program, 19 participants (5 females, 14 males) completed the program and received the certificate of completion.

**FEATURED RESEARCH**

**Camp Activities:**

The first week of the summer camp included various coding sessions with python including an introduction to python, numerical operations, data handling, data pre-processing, and data visualization. This allowed students to have a basic understanding of the most widely used python libraries such as NumPy, Pandas, and Seaborn.

The first week also included an invited talk from Mr. Zachary Campbell from Virginia Space Authority. During the session, he shared his experiences during his time as a NASA intern, and current work as the ThinSat Program Lead at Virginia Commercial Space Flight Authority.

The second week of the camp started off with an invited talk by Dr. Cassandra Oduola, Machine Learning, and Artificial Intelligence program manager at Microsoft. During the session, she shared her experiences in the fields of computer science, machine learning, and emerging areas of quantum computing.

During the second week of the camp, students were given with hands-on activities to help acclimate to the ThinSat environment and advanced concepts such as data wrangling, machine learning, and text processing. The sessions included classification and clustering techniques using Scikit-learn and Weka Explorer and Knowledge Flow, and ThinSat programming where students used Arduino IDE for developing, and deploying code for ThinSat.

using Scikit-learn and Weka Explorer and Knowledge Flow, and ThinSat programming where students used Arduino IDE for developing, and deploying code for ThinSat.
In addition, guest speakers from Twiggs Space Lab (developers of FlatSat picosatellites) Mr. Matt Craft and Dr. Jose Garcia provided introductions to the ThinSat development board, which the students utilized for their final project to design and carryout experiments. Sub-systems of ThinSat, types of sensors, and types of communication interfaces were discussed during the session.



*Certificate of completion*



*FTWIGGS SPACE LAB FLATSAT DEVELOPMENT BOARD*



*FTWIGGS SPACE LAB FLATSAT DEVELOPMENT BOARD*

# FEATURED RESEARCH

During the second week, Dr. Megan Chandrana joined the summer camp to share her experience as a Research Engineer at NASA Langley. Students were excited to listen to her past experience as a college intern at NASA and her path towards becoming a full-time scientist at NASA.

In addition to the regular lectures, students were teamed up (5 teams) to design an experiment using the ThinSat environment. Initially, students brainstormed project ideas which were then shortlisted based on feasibility and peer feedback within groups. Top ideas included,

- UV light comparison inside a house (data collected on a balcony, inside close to a window with and without blinds)
- Correlation between temperature and humidity at different locations
- Temperature and pressure measured in a vacuum
- IR and temperature sensor to look at light dispersion

Out of all the interesting experiments proposed by the students, experiments involving lighting (Luminous and IR), temperature, and humidity were selected. For collecting data for their experiments, students developed code to be run on the ThinSat development board. Then they applied their coding and data science skills acquired during the camp to experiment with the data collected.

Students utilized the Google Colab (Colaboratory) to write, execute code, data analysis, and share and document their project activities. A list of projects and their code repository and reports are included below.

- Group 1: Correlation between temperature and humidity at different locations
- Group 2: Finding the correlation between temperature and humidity
- Group 3: Correlation between Temperature and Humidity at different locations
- Group 4: The Effect of Blinds on the SolarLux and Infrared Sensors of a ThinSat
- Group 5: UV light comparison

Everything went well with this camp. Despite the fact that we had to go virtual because of COVID-19, the camp managed to be just as enjoyable as it would have been in person. the STRS camp was very good and I learn a lot from it. I would do it again
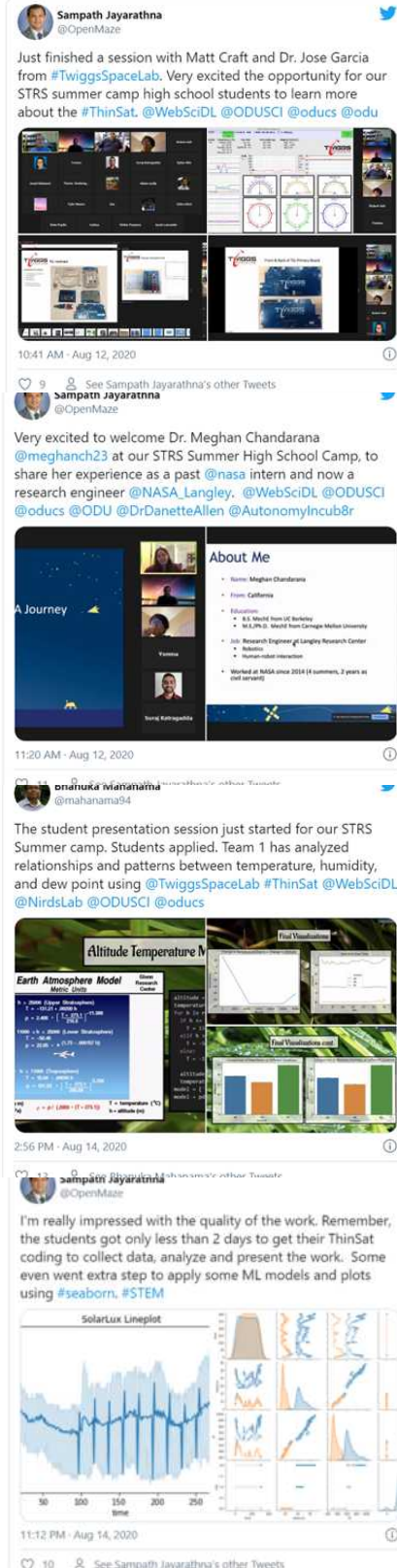


# FEATURED RESEARCH

# 2ND ANNUAL
# TRICK -OR- RESEARCH EVENT



The pandemic running wild did not deter the spirit of Halloween! The annual CS department research showcase "Trick-or-Research" was held virtually on October 27, 2020. The event was co-organized by the Computer Science Graduate Society (CSGS), ACM and ACM-W, led by Eleni Adam (President-CSGS), Maytha Alshammari (Vice-President-CSGS/ACM), and Dr. Sampath Jayarathna. This marks the second year of the Trick-or-Research event, designed as a way to introduce undergraduates and first-year graduate students to some of the awesome research that is going on in our department! This was an amazing opportunity for students to network with CS faculty and advanced graduate students. This year the event was also opened to participants from the Hampton Roads high schools and STEM academies.

A record number of labs presented in this year's event including 10 research labs, faculty members, and more than 25 research students presenting various research topics, demos, and hands-on activities. Overall 54 people were checked-in to the event participating in various activities such as costume contest and the raffle. The costume contest won by Ms. Holly Jenkins, dressed as "Tiger King", and second place by Dr. Sampath, dressed as "Zorro".

# DEPARTMENT
# EVENTS

Some of the positive remarks about the event from participants,

- *The event was fantastic!!!! I loved everything. The costumes, the awesome presentations done by the grad students. My three favorites were WSDL, hipsters, and Ai and applications. I can't wait until next year.*

- *I really loved all of the presentations by the students and staff! I am grateful for them all breaking down their work into understandable terms while addressing the questions I had about each project. I'm glad to see ODU has so many great minds!*

"Trick-or-research was a huge success again this year and we hope everyone enjoyed it, I'm excited and grateful for our CS Student Organization's effort leading this event and making it a great success!" said Dr. Sampath organizer of the last years' inaugural Trick-or-Research event. " I already have two freshman students joined my NIRDS research group, It was very thoughtful of the organizers to keep track of students interested in doing research and reaching out to faculty members, connecting both the undergraduate students and the faculty members at the conclusion of the event", said Dr. Sampath.



# DEPARTMENT EVENTS

# AT HOME ZOOMING WITH TOP INDUSTRY LEADERS

Pandemic or not, the Department of Computer Science made a commitment to students, the opportunity to speak with top industry speakers and share the blueprint on how to achieve their success.

With at least three talks per semester, the Fall brought us the following speaker
- Mr. Jeremy Yagle, *Assistant Branch Head for Information Management at NASA Langley Research Center's Office of the Chief Information Officer (OCIO)*
- Mr. Frank Bryum, *Chief Scientist at Spectrum Comm. Inc.*
- Michele Zhou, *Co-founder & CEO of Juji Inc.*

Spring 2021 Schedule:
- February 17th - Mr. Ron Dill, *Anthem*
- March 17th - Mr. Tom Valva, *ADP*
- April 21 - Mr. Johnny Garcia, *SIMIS, Inc.*







# DEPARTMENT EVENTS

# JOINING TOGETHER FOR A NEW GRANT

The National Institutes of Health recently awarded a 4-year grant renewal in the amount of $1.2M to Old Dominion University Research Foundation in support of the project "Multi-Resolution Docking Methods for Electron Microscopy". The lead investigators on this project are Dr. Jing He (Professor of Computer Science) and Dr. Willy Wriggers (PI and Batten Chair of Mechanical and Aerospace Engineering).



DR. JING HE
PROFESSOR
DEPT. OF COMPUTER SCIENCE

DR. WILLY WRIGGERS
BATTEN CHAIR OF MECHANICAL & AEROSPACE ENGINEERING

Dr. Wriggers has long been a recognized leader in the field of Electron Microscopy (EM) data analysis and has had a fruitful collaboration with Dr. He at ODU in recent years. The project was started by Dr. Wriggers in 2001 at The Scripps Research Institute, at a time when the computational modeling of EM data across resolution levels came of age and grew into a quantitative discipline. Dr. He is an early pioneer in biomolecular structure detection in EM images. The investigators have collaborated on this long-running project since 2015 when Wriggers joined ODU and teamed up with He who had been at ODU since 2009. Both computational investigators have known each other also from earlier roots in the Texas Medical Center in Houston where an active research environment for experimental EM technology exists: Dr. Wriggers was previously at the University of Texas at Houston where he collaborated with the National EM Center directed by Dr. He's Ph.D. advisor Wah Chiu at Baylor College of Medicine (now at Stanford University).

The aim of the new project is further development of a multiresolution docking methodology for building atomic models of biomolecular machines, predicated on cryo-Electron Microscopy (cryo-EM) and cryo Electron Tomography (cryo-ET) imaging data, that span resolution levels from the atomic to cellular in representing macromolecular complexes. Dr. He was the first to use deep learning for detecting secondary structure elements in cryo-EM images. Her CS experience allows the team to understand why deep learning outperforms the earlier image processing, instead of merely using it as a black box.
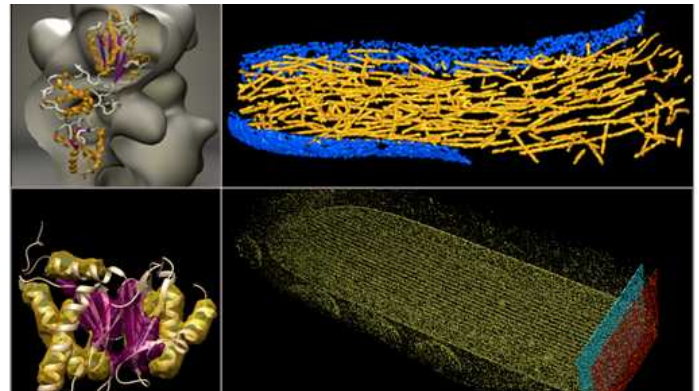


# FACULTY / STAFF NEWS

# 45 YEARS OF SERVICE & COUNTING

A native of Norfolk, Virginia, Ms. Phyllis Woods (also known as Ms. Phyl) came to work with Dr. David Hager, former-Dean of the School of Graduate Studies at Old Dominion University in January 1975.

In 1981, the School of Graduate Studies was decentralized and Ms. Phyl was relocated to the Registrar's Office. There she processed graduation for Masters and PhD Students for every academic program on campus at the time.

In November of 1984, she was hired by Dr. James Schwing (former acting Chair) of the Computer Science Department as secretary to the Department Chair.

For twenty-eight years she served as the right-hand "woman" to Former Chair, Dr. Kurt Maly, beginning in 1985. Known for her wisdom and endless captivating stories. At 67 years young (68 in March 2021), Ms. Phyl has mentored countless student workers, graduate students, summer interns, and even some of her colleagues. A beloved institution within our Department, Ms. Phyl is even more cherished at home.  She has three daughters, nine grandchildren, and two great-grandsons who call her "Gigi". This "Gigi" was recently honored by Governor Ralph Northam at a virtual event honoring Virginia State Employees.

We would like to congratulate Ms. Phyl on her years of service and thank her for her love and commitment to ODU and the Computer Science Department.

# FACULTY / STAFF NEWS

We are proud of your success and want you to stay in touch. Once the pandemic is over, If you're ever back in the Hampton Roads area, stop by campus for a visit.

Want to contribute to our newsletter? Email us at Newsletter@cs.odu.edu

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