1. **Gonzalo Arce, Charles B. Evans Professor of Electrical and Computer Engineering**

   Research Project:

   Join Prof. Gonzalo R. Arce (Charles B. Evans Professor of Electrical & Computer Engineering) to push the frontier of graph and hypergraph machine learning for long-horizon forecasting in complex systems. We are building models that fuse time-series dynamics with network structure to anticipate climate and Earth-system trajectories, biomedical progression, and financial market behavior. Projects span representation learning on irregular spatio-temporal graphs, stability-aware long-term prediction, and uncertainty quantification—grounded in signal processing and spectral/Fourier methods. You'll help craft scalable algorithms that learn from sparse, noisy observations while enforcing physical or structural priors, and validate them on real-world datasets where accuracy over weeks, months, and years truly matters.

   A second thrust develops generative ML for computational LiDAR imaging, creating priors and reconstruction engines that enable high-fidelity 3D sensing under low-photon and adverse conditions. Help us create super-resolution 3D/4D maps of our planets in our Solar System in NASA-driven research. These efforts emphasize robustness and deployment at scale. Ideal candidates bring strong analytical and math skills, signal processing, machine learning, and Python.

   If you want to publish at top venues, release impactful tools, and collaborate across Earth and Planetary science, biomedicine, and finance, explore the group and get in touch: https://www.eecis.udel.edu/~arce/.

2. Kenneth E. Barner, **Signal and Information Processing Laboratory, University of Delaware**

   The Signal and Information Processing Laboratory, led by Prof. Kenneth E. Barner, advances machine learning and artificial intelligence for high-impact applications in imaging, biomedical analysis, and autonomous systems. The group develops statistical, nonlinear, and graph-based signal processing methods to analyze and interpret complex, real-world data in the presence of noise, nonstationarity, and domain shift. Current projects span deep learning for medical and biomedical imaging, including ultrasound segmentation, multimodal fusion, and ECG classification, as well as robust learning under low-data conditions and interpretable AI for enhanced diagnostic reliability. Beyond healthcare, the lab utilizes AI-driven perception for autonomous vehicles and drone-based sensing, enabling 3D modeling, environmental reconstruction, and security applications. Recent efforts include domain generalization, diffusion-based data augmentation, and adversarial robustness for resilient perception systems. With a strong record of interdisciplinary collaboration and over $14M in sponsored research, the group combines foundational ML theory with translational impact in imaging, sensing, and intelligent systems

3. Austin Brockmeier

   In the first project, we seek to identify the relevant information extracted from data by neural networks that is integral for subsequent tasks and human-in-the-loop inspection. We have shown how shared text-image representations can be decomposed and modified to enable efficient data compression while still maintaining task performance. Relatedly, we are optimizing artificial neural networks to better align two different data modalities, given either shared views or labeled data. In the second project, we seek to systematically identify and validate EEG signatures of epilepsy embedded in background EEG using advanced machine learning techniques. By uncovering these hidden markers, we aim to improve diagnostic accuracy, reduce time to diagnosis, and ultimately enable earlier and more targeted interventions for individuals with epilepsy.

4. Nektarios Tsoutsos, Associate Director, Center for Cybersecurity, Assurance and Privacy

   Research Projects:
   (1) acceleration of cryptographic primitives; develop optimizations for homomorphic encryption. (2) secure firmware updates for digital manufacturing; integration with software update systems, (3) Deployment of a web-based IDE based on Theia-Cloud and Kubernetes.
   Skills: Good analytical and computer programming skills (C/C++ and Python required), Linux OS, understanding of computer security principles.
   URL: https://udel.edu/~tsoutsos/

5. Chengmo Yang

   Prof. Chengmo Yang's group works on improving the security and reliability of machine learning accelerators, as well as securing hardware design with machine learning. Students who have a background in hardware design, FPGA, VHDL/Verilog, cybersecurity, embedded systems, and/or machine learning are welcome to apply. Recent work can be found here:
   https://scholar.google.com/citations?hl=en&user=d8KWMt8AAAAJ&view_op=list_works&sortby=pubdate

6. Nathan Lazarus, Liquid Metal Electromagnetics for Wearables and Soft Robotics

   Our group at the University of Delaware specializes in the development of highly soft and stretchable devices for power and actuation, particularly on the human body. Stretchable conductors based on non-toxic room-temperature liquid metals are used to create high-performance coils that can match the mechanical performance of human skin and tissue. On-going projects include the development of stretchable sensors for joint protection in the elderly, the creation of more comfortable haptic interfaces intended to be worn in close contact with the skin, and the development of untethered soft robotic platforms for underwater and subterranean applications.
   Lab URL: lazaruslaboratory.com

7. Mohsen Badiey, Professor in Electrical and Computer Engineering Research Projects:

(1) Signal processing and applied machine learning for underwater acoustics and environmental signals using real-world data. This project involves physics-based numerical modeling of underwater sound transmission in shallow water regions, including sea-going field experimentation opportunities for data collection. Students experience the design and processing of real-world systems in connection with an electrical engineering program.
Required skills for this position: Excellent analytical and mathematical skills, as well as an Applied Physics background, and the ability to work independently on a project. Interest and knowledge of signal processing, machine learning, and Python/Matlab programming.
(2) Design and fabrication, and prototyping of multichannel data acquisition systems. This project involves electronic instrumentation, microcontroller programming, and embedded systems for underwater sensors to collect real-world data.
Required skills for this position: Excellent analytical and mathematical background, and the ability to work independently to build systems. Applied Physics background, and in-depth knowledge of coding in support of system fabrication and computer engineering, including hands-on experience with printed circuit board (PCB) and embedded systems, especially for acoustical and audio engineering.

For more information, see our website: **https://www.eecis.udel.edu/~badiey/**