

# James Smith

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**RESEARCH FOCUS** I want to build vision systems which learn from data that is from multiple sources and distributions, while protecting data privacy concerns. To work towards this goal, I look at problems such as: **lifelong/continual learning, knowledge distillation, federated learning, and low-label classification.**

**EDUCATION** **PhD in Machine Learning, Georgia Institute of Technology** (current)

Advisor: *Dr. Zolt Kira*

Enrolled: August 2018 | Expected Graduation Date: May 2023

**Master of Science in Electrical Engineering, Auburn University** (May 2018)

Advisor: *Dr. Bogdan Wilamowski*

**Bachelor of Electrical Engineering, Auburn University** (May 2017)

Minors in Computer Science, Political Science

- PUBLICATIONS**
- [1] **James Smith**, Yen-Chang Hsu, Jonathan Balloch, Yilin Shen, Hongxia Jin, Zolt Kira. “Always Be Dreaming: A New Approach for Data-Free Class-Incremental Learning”, International Conference on Computer Vision (ICCV), 2021. **(25.9% acceptance rate)** [\[Paper\]](#) [\[Code\]](#)
  - [2] **James Smith**, Cameron Taylor, Seth Baer, Constantine Dovrolis. “Unsupervised Progressive Learning and the STAM Architecture”, *International Joint Conference on Artificial Intelligence (IJCAI)*, 2021. **(13.9% acceptance rate)** [\[Paper\]](#) [\[Code\]](#)
  - [3] **James Smith**, Yen-Chang Hsu, Jonathan Balloch, Zolt Kira. “Memory-Efficient Semi-Supervised Continual Learning: The World is its Own Replay Buffer”, *International Joint Conference on Neural Networks (IJCNN)*, 2021. [\[Paper\]](#) [\[Code\]](#)
  - [4] **James Smith**, Bo Wu, Bogdan Wilamowski. “Neural Network Training with Levenberg–Marquardt and Adaptable Weight Compression”, *IEEE Transactions on Neural Networks and Learning Systems*, 30(2), 580-587, 2019. [\[Paper\]](#)
  - [5] **James Smith**, Michael Baginski. “Thin-Wire Antenna Design Using a Novel Branching Scheme and Genetic Algorithm Optimization”, *IEEE Transactions on Antennas and Propagation*, 67(5), 2934-2941, 2019. [\[Paper\]](#)
  - [6] Bo Wu, **James Smith**, Bogdan Wilamowski, Mark Nelms. “DCMDS: Density-Concentrated Multi-Dimensional Scaling Algorithm for Data Visualization”, *Journal of Visualization*, 22, 341-357, 2019. [\[Paper\]](#)
  - [7] **James Smith**, Bogdan Wilamowski. “Discrete Cosine Transform Spectral Pooling Layers for Convolutional Neural Networks”, *International Conference on Artificial Intelligence and Soft Computing (ICAISC)*, Zakopane, Poland, 2018. [\[Paper\]](#)

- WORKSHOPS**
- [8] **James Smith**, Seth Baer, Cameron Taylor, Constantine Dovrolis. “Unsupervised Progressive Learning and the STAM Architecture”, *Lifelong Learning Workshop at ICML*, 2020.
  - [9] **James Smith**, Seth Baer, Zolt Kira, Constantine Dovrolis. “Unsupervised Continual Learning and Self-Taught Associate Memory Hierarchies”, *LLD Workshop at ICLR*, 2019.

<b>RELEVANT EXPERIENCE</b>	<b>Georgia Tech</b> Atlanta, GA <i>Graduate Research Assistant, College of Computing</i>	Since August 2018
	<b>SRI International</b> Princeton, NJ (virtual from Atlanta) <i>Computer Vision Research Intern, PhD</i>	May 2021 – August 2021
	<b>Radiance Technologies</b> Huntsville, AL <i>Machine Learning Intern</i>	May 2018 – August 2018
	<b>Auburn University</b> Auburn, AL <i>Graduate Research Assistant, Department of Electrical and Computer Engineering</i>	May 2017 – May 2018
	<b>Auburn University</b> Auburn, AL <i>Undergraduate Research Fellow</i>	July 2016 – May 2017
	<b>Naval Research Laboratories</b> Washington, DC <i>Research Intern</i>	May 2015 – August 2015
<b>SELECTED PROJECTS</b>	<b>Data-Free Class-Incremental Learning [1]</b>	
	<ul style="list-style-type: none"> <li>We contribute a novel incremental distillation strategy which does not store training data, achieving state-of-the-art performance on data-free class-incremental learning benchmarks</li> <li>Impact: reduce memory budget and eliminate private data storage for incremental learning applications (healthcare, autonomous vehicles, etc.)</li> </ul>	
	<b>Unsupervised Progressive Learning [2,8,9]</b>	
	<ul style="list-style-type: none"> <li>We formalize the Unsupervised Progressive Learning (UPL) setting: learning representations for downstream tasks (such as classification) from a non-stationary stream of unlabeled data in which the number of object classes increases with time</li> <li>We contribute a neuro-inspired architecture for UPL which involves an online clustering modules, called Self-Taught Associative Memory (STAM)</li> <li>Impact: enable fast and efficient low-label streaming applications such as facial recognition</li> </ul>	
	<b>Semi-Supervised Continual Learning [3]</b>	
	<ul style="list-style-type: none"> <li>We formalize the realistic Semi-Supervised Continual Learning (SSCL) setting, where data distributions reflect object class correlations between, and among, the labeled and unlabeled data distributions</li> <li>We contribute a novel learning approach that works within this realistic, memory-constrained continual learning setting, DistillMatch, notably outperforming closest prior art</li> <li>Impact: enable SSCL for on-device learning that is robust to several realistic data SSCL distributions</li> </ul>	
<b>HONORS</b>	<ul style="list-style-type: none"> <li>NSF Graduate Research Fellowship Program Honorable Mention – 2018</li> <li>Alton B. Zerby and Carl T. Koerner National Outstanding Electrical and Computer Engineering Student Award, L.A. Alumni Chapter IEEE/HKN – 2017 <b>(one of two nationwide recipients)</b></li> <li>President’s Award, Samuel Ginn College of Engineering – 2017 <b>(single recipient)</b></li> <li>ECE Outstanding Student of the Year, Auburn University – 2017 <b>(single recipient)</b></li> <li>Auburn University Nominee for Rhodes and Marshall Scholarships – 2016</li> </ul>	
<b>OTHER</b>	<ul style="list-style-type: none"> <li>Co-organizer of <a href="#">Georgia Tech ML PhD Student Seminar Series</a> (Since August 2020)</li> </ul>	