Angeline Aguinaldo

✉ aaguinal@cs.umd.edu | ⌨ aaguinal

Education

University of Maryland, College Park   *College Park, MD*
Ph.D. Computer Science   *Sept. 2018 - Present*

Drexel University, College of Engineering   *Philadelphia, PA*
M.S. Electrical Engineering   *Sept. 2012 - Jun. 2017*

Drexel University, School of Biomedical Engineering   *Philadelphia, PA*
B.S. Biomedical Engineering, *magna cum laude*   *Sept. 2012 - Jun. 2017*

Professional Experience

Johns Hopkins University Applied Physics Laboratory   *Aug. 2017 - Present*
Research Staff Member   *Laurel, MD*

- Manages a project that analyzes publicly available information from social media identify emerging narratives in order to combat disinformation. This involves managing a team of (13) software developers, data scientists, and analysts and a budget of $2.1 million dollars.
- Leads a team of (3) mathematics researchers in exploring the use of category theoretic structures to model high-level and low-level views of a software program stacks, C programs to P-CODE opcode sequences
- Led a team of (5) software developers in the technical design and implementation of a modular test and evaluation software system for 18+ third-party metagenomic classifiers in order to compare their computational performance and accuracy
- Led a team of (6) software developers in the technical design and implementation of a full-stack software framework aimed at processing high-resolution geospatial imagery using multiple (5) deep learning computer vision algorithms for flood identification, building damage assessment, and ingress and egress route mapping post-natural disaster event
    - This work was referenced in a Johns Hopkins University Applied Physics Laboratory press release entitled *"APL Shaping an Intelligent Approach to Disaster Response and Relief"*
    - This work was presented at the INFORMS Conference on Security in February 2020
- Designed and implemented a web application that would be used as the primary interface for participants in a human research study aimed at characterizing human mental models of AI technology

Research Experience

Department of Computer Science, University of Maryland, College Park   *Sept. 2018 - Present*
Graduate Researcher   *College Park, MD*

- Topic: Framework for evaluating functional interoperability in industrial robotics using category theory
- Work with **Dr. William Regli** and collaborators from Siemens Corporate Technology to develop an interoperable compiler language for robot programmings using category theory which was funded by Advanced Robotics for Manufacturing (ARM)
- Collaborate with mathematicians and engineers from the National Institute for Science and Technology (NIST) and faculty from Carnegie Mellon University to demonstrate examples of category theory applied to robotic programming
    - Talk entitled "Intuitive robotic programming using string diagrams" was presented at the American Mathematical Society (AMS) Applied Category Theory Workshop 2019

Computational Bioimage Analysis Laboratory, Drexel University   *Sept. 2015 - Jun. 2017*
Graduate Researcher   *Philadelphia, PA*

- Worked with **Dr. Andrew Cohen** to develop features for **LEVer**, an automated cell microscopy image analysis, lineaging, and editing software
- Designed advanced object segmentation and tracking algorithms to characterize culture proliferation in various cell types (e.g. non-small lung cancer cells, neural progenitor cells, T-cells, embryonic stem cells)
- Developed solutions for mitotic detection screening, which included ingesting, cleaning, and processing data; extracting features; building and traversing graphs; and designing machine learning ensembles

Publications

A Graphical Model-Based Representation for Classical AI Plans using Category Theory   *2021*
Intl. Conf. for Automated Planning and Scheduling (ICAPS): Explainable AI Planning Workshop
A. Aguinaldo, W. Regli

Encoding Compositionality in Classical Planning Solutions *2021*
Intl. Joint Conf. on Artificial Intelligence (IJCAI): Generalizations in Planning Workshop
A. Aguinaldo, A. W. Regli

RoboCat: A Category Theoretic Framework for Robotic Interoperability Using Goal-Oriented Programming *2021*
IEEE Transactions for Automation Science and Engineering
A. Aguinaldo, J. Bunker, B. Pollard, A. Shukla, A. Canedo, G. Quiros, W. Regli

Separating touching cells using pixel replicated elliptical shape models *2019*
IEEE Transactions on Image Processing
M. Winter, W. Mankowski, E. Wait, E. Cardenas De La Hoz, A. Aguinaldo, A. R. Cohen

Women break an engineering barrier *2017*
IEEE Pulse
C. Gutierrez, M. Paulosky, A. Aguinaldo, and J. Gerhart

A neuronal network of mitochondrial dynamics regulates metastasis *2016*
Nature Communications
M. C. Caino, J. Ho Seo, A. Aguinaldo, E. Wait, K. G. Bryant, A. V. Kossenkov, J. E. Hayden, V. Vaira, A. Morotti, S. Ferrero, S. Bosari, D. I. Gabrilovich, L. R. Languino, A. R. Cohen, D. C. Altieri

Extracurricular & Volunteer

The Adjoint School *Applied Category Theory Conf.*
Co-organizer, Student *Mar 2021 - Present*
- As a co-organizer, recruit mentors, evaluate student application, facilitate bi-weekly seminars, and coordinate a research week for an annual research school in applied category theory
- As a student, participated in bi-weekly seminars, presented a talk entitled "Decorated Cospans for network security", and published a blogpost on *the N-Category Cafe* entitled "Cospans and Computation (Part 2)"

Applied Category Theory Working Group *JHU Applied Physics Laboratory*
Coordinator *Jan. 2021 - Present*
- Organize regular talks and events that explore topics of applied category theory

Skills

Topics	Software engineering, Category theory, Robotics, Deep learning, Computer vision, Geospatial Information Systems
Technologies	Docker, MongoDB, Redis, PostgreSQL, Angular.js, Node.js, Vue.js, Bootstrap, FastAPI, Flask, Tensorflow, PyTorch, GDAL, OpenCV
Programming	Python, MATLAB, JavaScript, HTML/CSS, Java, Julia, C++