Christopher Flathmann

Curriculum Vitae

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Education

2019–Present **PhD, Human Centered Computing**, *Clemson University,Clemson, South Carolina*.

2018 **BS Computer Science**, *GPA: 3.89*, *Clemson University,Clemson, South Carolina*.

Work Experience

2019–Present **Clemson University** Graduate Research Assistant, **Team Research Analytics in Computational Environments (TRACE)**. Researching how to build AI agents to interact with humans and other AI in collaborative environments.

2018 **Clemson University** Undergraduate Research Assistant, **Data Intensive Computing Ecosystems Lab**. Researched the affects of latency on high performance computing clusters in commercial cloud environments

2018 **Amazon** Software Development Engineer Intern, Financial Technology. Created and Evaluated a system for email matching payments and responses for financial collections using AWS EC2, S3, and Lambda

2017 **Clemson University** Undergraduate Teaching Assistant for Algorithms and Data Structures in C++ for **Dr. Brian Dean.** Taught labs, held office hours for undergraduate students, and helped design and proctor programming exams.

2017 **Michelin** Software Development Engineer Intern for Research and Development. Design software in C# to manage Agile Teams' members, software responsibilities, and skills.

Funding and Awards

2019 NSF **Technology-Human Integrated Knowledge Education and Research** Fellow

2019 Clemson **Three Minute Thesis** Finalist for the College of Computing, Engineering, and Applied Science

2017 DuPont Undergraduate Project of the Year: Smart Aiding Application for Travel Safety

Research Interests

Artificial Intelligence, Ethical Design of AI, Swarm Intelligence, Artificial Population Simulation, Human-AI Teamwork, AI-AI Teamwork, Collaborative Technology, Human Computer Interaction, Human Centered Design

Current Research Projects

Human Perceptions of AI Trained on Human Derived Ethical Frameworks
Collaborators: Nathan McNeese, Bekk Blando, Dylan Cathapermal, Casey Hird

- Implementing the ethical frameworks of Utilitarianism, Deontology, and Virtue Ethics in Reinforcement Learning and examining human preference towards agents built on each framework. Humans are tasked with collaborating with these AI agents to make ethical decisions. Human preference and influence of AI on human decision making will be evaluated.

Effects of Artificial Intelligence Combative Language and Behavior on Human-AI Collaboration
Collaborators: Nathan McNeese, Beau Schelble, Casey Hird

- Designing artificial agents to speak and act combative, such as being impatient and attempting to usurp another users work. Experiment seeking to observe if humans prefer a more active AI agent that can be viewed as combative or a passive agent that only responds to human commands.

Human-Machine Teamwork in Artificial Swarm Intelligence
Collaborators: Nathan McNeese, Geoff Musick, Lorenzo Barberis Canonico, Steve Russell

- Designs artificial agents using reinforcement learning with the goal of learning how to play hands of poker. These agents are then placed in a cooperative environment alongside well performing humans and other agents with the goal of cooperatively betting on each hand of poker. The goal of the study is to determine the practical viability and performance of swarms when dealing with only humans, humans and AI agents, and only AI agents.

Bubble Poppers: A Recommendation System to Burst Filter Bubbles
Collaborators: Lorenzo Barberis Canonico, Nathan McNeese

- Filter bubbles can occur when users are repeatedly recommended content within a certain environment for the purposes of maximize time of consumption, which can result in users entering filter bubbles that limit their exposure to new and varied content. This research looks to pop these bubbles by creating a recommender system that looks at preventing a large amount of recommendations from being produced that would create one of these filter bubbles.

Skills

Programming	Python, C#, SQL, Java, C++, R, JavaScript
Tools	Tensorflow, Tensorforce, GitHub, AWS, Node.js
Research	Quantitative Analysis, Qualitative Analysis, Focus Groups, Wizard of Oz

Relevant Coursework

- The Science of Teamwork and Technology
- Measurement and Evaluation of Human Centered Computing Systems
- Research Methods for Human Centered Computing
- Applied Data Science
- Database Management Systems

Publications

Conference Papers

[C.3] **Flathmann, C.**, McNeese, N., & Barberis Canonico, L. (Accepted). Using Human-Agent Teams to Purposefully Design Multi-Agent Systems. *2019 Annual Meeting of Human Factors and Ergonomics Society.* Seattle, WA. Sage CA: Los Angeles, CA: SAGE Publications.

[C.2] Barberis Canonico, L., McNeese, N., & **Flathmann, C.** (Accepted). Collectively Intelligent Teams: Integrating Team Cognition, Collective Intelligence, and AI for Future Teaming. *2019 Annual Meeting of Human Factors and Ergonomics Society.* Seattle, WA. Sage CA: Los Angeles, CA: SAGE Publications

[C.1] Barberis Canonico, L., McNeese, N., & **Flathmann, C.** (Accepted). The Wisdom of the Market: Using Human Factors to Design Prediction Markets for Collective Intelligence. *2019 Annual Meeting of Human Factors and Ergonomics Society.* Seattle, WA. Sage CA: Los Angeles, CA: SAGE Publications.

Research Posters

[P.2] **Flathmann, C.**, Schelble, B., & McNeese, N. (2019) Creating Human-Oriented Multi-Agent Teams. *Insights @ BMW Manufacturing Co. LLC.* 12 September 2019

[P.1] **Flathmann, C.** & McNeese, N. (2019) Using Human-Agent Teams to Purposefully Design Multi-Agent Teams. *Clemson 2019 Research Symposium* 12 April 2019

Under Review

[U.4] **Flathmann, C.**, McNeese, N., & Huff, E. (Submitted). Using Swarm Intelligence to Resist Bias Attacks on Training Data. *Journal of Artificial Intelligence Research*

[U.3] **Flathmann, C.** & McNeese, N. (Submitted). Enhancing the Multiple Traveling Salesman Problem from a Group Problem to a Team Problem. *Autonomous Agents and Multi-Agent Systems.*

[U.2] Canonico, L., McNeese, N., Schelble, B., & **Flathmann, C.** (Submitted). Human-AI Teams as Multi-Agent Systems. *Journal of cognitive engineering and decision making.*

[U.1] Canonico, L., McNeese, N., Schelble, B., & **Flathmann, C.** (Submitted). Game Theory for Teams: Using Game Theory Models to Understand Human-AI Teamwork. IEEE Transactions on Human-Machine Systems.

Works in Progress

[U.4] **Flathmann, C.**, Schelble, B., & McNeese, N. (In Progress). The Need to Prioritise the Integration of Artificial Intelligence Into Multi-Cultural Teams *Journal of Artificial Intelligence Research*

[U.4] **Flathmann, C.**, Musick, G., McNeese, N., Canonico, L.,& Russell, S. (In Progress). Human-Machine Teamwork in Artificial Swarm Intelligence