Christopher Flathmann

Curriculum Vitae

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Education

2019–2022 **PhD, Human Centered Computing**, *GPA: 4.00*, *Clemson University, Clemson, South Carolina*.
Advisor: **Nathan McNeese**

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)**. Senior Lead PhD student researching human-AI teamwork in contexts from swarm intelligence to ethical decision making.

2018 **Clemson University** Undergraduate Research Assistant, **Data Intensive Computing Ecosystems Lab**. Researched the effects 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. Designed 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

Human-Centered Artificial Intelligence, Ethical Design of AI, Swarm Intelligence, Human-AI Teamwork, Human and AI influence in human-AI systems

Current Research Projects

Human Perceptions of AI Trained on Human Derived Moral Theories
Collaborators: Nathan McNeese, Rohit Mallick, Top Lee

- 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.

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

- Designing artificial agents using reinforcement learning to collaboratively determine which items should be prioritized in a survival scenario. These agents are then placed in a cooperative environment alongside humans and other agents to create a master survival list for the group. The goal of the study is to determine the practical viability and performance of swarms when dealing with only humans or humans with AI agents.

Skills

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

Relevant Coursework

- Artificial Intelligence
- The Science of Teamwork and Technology
- Measurement and Evaluation of Human Centered Computing Systems
- Human Perceptions and Behaviors
- Research Methods for Human Centered Computing
- Applied Data Science
- Digital and Smart Manufacturing
- Cloud Computing Architecture

Publications

Conference Papers

[C.7] Beau Schelble, **Christopher Flathmann**, Lorenzo-Barberis Canonico, and Nathan McNeese. 2020 (Accepted). Understanding Human-AI Cooperation Through Game-Theory and Reinforcement Learning Models. In *Proceedings of the 53rd Hawaii international conference on system sciences.*

[C.6] **Christopher Flathmann**, Beau Schelble, Brock Tubre, Nathan McNeese, and Paige Rodeghero. 2020 (Accepted). Invoking Principles of Groupware to Develop and Evaluate Present and Future Human-Agent Teams. In *Proceedings of the 8th International Conference on Human-Agent Interaction.*

[C.5] Beau Schelble, **Christopher Flathmann**, and Nathan McNeese. 2020 (Accepted). Towards Meaningfully Integrating Human-Autonomy Teaming in Applied Settings. In *Proceedings of the 8th International Conference on Human-Agent Interaction.*

[C.4] Geoff Musick, Divine Maloney, **Christopher Flathmann**, Nathan McNeese, and Jamiahus Walton. 2020 (Accepted). Differentiated Instruction further Realized through Teacher-Agent Teaming. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting.*

[C.3] **Christopher Flathmann**, Nathan McNeese, and Lorenzo Barberis Canonico. 2019. Using Human-Agent Teams to Purposefully Design Multi-Agent Systems. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 1425–1429. https://doi.org/10.1177%2F1071181319631238

[C.2] Lorenzo Barberis Canonico, **Christopher Flathmann**, and Nathan McNeese. 2019. Collectively intelligent teams: Integrating team cognition, collective intelligence, and ai for future teaming. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 1466–1470. https://doi.org/10.1177%2F1071181319631278

[C.1] Lorenzo Barberis Canonico, **Christopher Flathmann**, and Nathan McNeese. 2019. The wisdom of the market: Using human factors to design prediction markets for collective intelligence. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 1471–1475. https://doi.org/10.1177%2F1071181319631282

Research Posters

[P.2] **Christopher Flathmann** and Nathan McNeese. 2020. TCreating Human-Oriented Multi-Agent Teams. In *Insights @ BMW Manufacturing Co. LLC.* 12 September 2019

[P.1] **Christopher Flathmann**, Beau Schelble, and Nathan McNeese. 2020. Using Human-Agent Teams to Purposefully Design Multi-Agent Teams. *Clemson 2019 Research Symposium* 12 April 2019

Under Review

[U.1] **Christopher Flathmann**, Beau Schelble, Nathan McNeese, Jeremy Lopez, and Casy Hird. 2021. Passive or Aggressive? Human Perceptions of Agent Teammate Behavior in Human-Agent Teaming. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*

Works in Progress

[W.2] **Christopher Flathmann**, Rohit Mallick, Top Lee, and Nathan McNeese (In Progress). Human Perceptions of AI Trained on Human Derived Moral Theories

[W.1] **Christopher Flathmann**, Nathan McNeese, and Stephen Russel. (In Progress). Human-Machine Teamwork in Artificial Swarm Intelligence

Grant and Award Contribution

As the senior Ph.D. student in TRACE Research Group, I have had the opportunity to contribute to the writing of multiple grant and funding opportunities.

Funded Considerations of Ethical and Unethical Behavior on Trust in Human-Autonomy Teaming. AFOSR. **$586,538**

Funded Promoting Human Interpretation and Interaction to Mitigate Bias in Artificial Intelligence Assisted Decision Aids. ONR. **$450,000**

Under Review Leveraging Multi-Culturalism and Swarm Intelligence for the Development of Ethical and Fair Artificial Intelligence. National Science Foundation. **$1,248,494**

Under Review Accessing the Interactions Between Cyber-Social and Cyber-Physical Teaming. ONR DURIP. **$287,848.02**

Professional Activities

Student Mentoring

Recently, I have designed and created a mentor program for **Clemson THINKER** with the goal of getting undergraduate students more involved in STEM research.

THINKER Mentor Program
Steven Russell- BS Computer Science, *Clemson University, Fall 2020 - Present*

TRACE Research Group
Casey Hird- BS Math, *Clemson University,Fall 2019 - Spring 2020*
Dylan Cathapermal- BS Computer Science, *Clemson University, Fall 2019 - Present*

Reviewing

Conferences
Human Factors and Ergonomics Society Annual Meeting (HFES), since 2020
Winter Simulations Conference (WSC), since 2020
Military Health System Research Symposium (MHSRS), since 2020