Curriculum Vitae

John Wesley Hostetter

Raleigh, NC 27606 —Open to Relocate

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I develop methodologies to construct human-readable neural architectures that may facilitate knowledge transfer. These systems —self-organizing neuro-fuzzy networks, may substitute traditional feed-forward neural networks.

RESEARCH & DEVELOPMENT EXPERIENCE

North Carolina State University, Raleigh NC

Graduate Research Assistant — January 2022 – Present / January 2021 – August 2021

Research Group: Improving Undergraduate STEM Education (IUSE) — Remote

- Conduct empirical research on improving undergraduate learning using Intelligent Tutoring Systems
- Oversaw setup of **18 ML models across 8 IRB studies involving a total of 2,770 human-subjects**

Select Research Contributions:

- Created the **first neuro-fuzzy network (NFN) for reinforcement learning in computer vision** (*dissertation*)
- Designed the **first model-free, offline reinforcement learning NFN**; later published in AAMAS 2023 (*first author*)
- Delivered real-time personalized explanations in ITSs; later published in IVA 2023 (*first author & best paper finalist*)
- Extract transparent knowledge from deep neural networks; later published in FUZZ IEEE 2023 (*first author*)

Global Data Consultants IT Solutions

Application Developer — June 2018 – August 2018

Internship — In-Person

- Built a cross-platform mobile application using Xamarin Forms with Model-View-ViewModel architecture where clients may approve/reject contractors' timesheets
- Microsoft Xamarin Certified Professional

TEACHING & INSTRUCTIONAL DESIGN EXPERIENCE

The Artificial Intelligence Academy at NC State University

Assistant Instructor — July 2022 – June 2024

Courses: (1) Introduction to Artificial Intelligence and (2) Machine Learning — Remote

- Taught a total of approximately 1,000 industry experts (e.g., NASA, Lexmark, JPMorgan Chase & Co.)
- Sponsored by the Department of Labor to prepare entry-level AI professionals for industry partners

Graduate Service Assistant — May 2020 – August 2020

Course: Data Mining — Remote

- Developed course curriculum, workshop material and teacher solutions

North Carolina State University, Raleigh NC

Graduate Teaching Assistant — August 2021 – December 2021

CSC 422/522 Automated Learning and Data Analysis — Hybrid

- Assisted teaching 68 undergraduate and 150 graduate students on support vector machines, deep learning, etc.

August 2020 – December 2020

CSC 422/522 Automated Learning and Data Analysis — Remote

- 45 undergraduate and 107 graduate students

January 2020 – May 2020

CSC 333 Automata, Grammars, and Computability — In-Person & Later Remote

- 69 students on theory of computation topics such as regular languages, Turing machines, etc.

August 2019 – December 2019

CSC 216 Programming Concepts - Java — In-Person

- Led lab sessions for two classes of 23 undergraduate students each

EDUCATION

North Carolina State University   Raleigh, NC
Ph.D. in Computer Science   *Defend in Late February 2025*
- Dissertation Title: The Morphetic ϵ-Delayed Neuro-Fuzzy Network – A General Architecture for Transparent Rule-Based Decision-Making
- Committee: James Lester, Munindar Singh, Wenbin Lu, and Min Chi (*Chair & Advisor*)
- Unconditional pass on proposal of dissertation topic

North Carolina State University   Raleigh, NC
M.Sc. in Computer Science   *2022*
- Awarded the *Graduate Merit Award* (x3) by the College of Engineering in 2019, '21, and '22
- GPA: 3.83/4.00

The Pennsylvania State University   Harrisburg, PA
B.Sc. in Computer Science   *2019*
- Placed on the *Dean's List* (x4) in Fall 2016, Spring '17, Spring '18 and Spring '19
- Enrolled in the Capital College Honors Program from 2017-'18
- GPA: 3.66/4.00

Embry-Riddle Aeronautical University   Daytona Beach, FL
Coursework in Engineering Physics   *2015 - 2016*
- Awarded *Dean's Scholarship* by the Embry-Riddle Aeronautical University Scholarship Committee

RESEARCH INTERESTS

- ARTIFICIAL INTELLIGENCE: Neuro-Symbolic AI, eXplainable AI, Online/Offline Reinforcement Learning
- UNCERTAINTY: Fuzzy Logic, Multi-Valued Logic, Approximate Reasoning, Rough Sets, Granular Computing

RESEARCH MENTORING

Ph.D. Students Mentored:

1. Adittya Soukarjya Saha	NC State	2023-2024
2. Rajesh Debnath	NC State	2023-2024
3. Md Mirajul Islam	NC State	2023-2024
4. Safaa Mohamed	NC State	2023-2024

M.Sc. Students Mentored:

1. Gyuhun Jung	NC State	2023

COMMUNITY, SERVICE & LEADERSHIP

Volunteer Student Coordinator   October 2022 – Present
NC State Computer Science Doctoral Recruiting   *Raleigh, NC*
- Assemble and led volunteer teams of 28 currently enrolled Ph.D. students (total) to recruit new Ph.D. students

Peer Reviewer   2025
The 28th International Conference on Artificial Intelligence and Statistics   *AISTATS*

Peer Reviewer   2025
The 13th International Conference on Learning Representations   *ICLR*

Peer Reviewer   2024
The 38th Annual Conference on Neural Information Processing Systems   *NeurIPS*

Peer Reviewer   2022 & 2024
ACM Conference on Human Factors in Computing Systems   *CHI*

Program Committee Member of Main Track   2023 – 2025
The 13th, 14th, & 15th Symposium on Educational Advances in Artificial Intelligence   *EAAI*

Volunteer   May 29, 2023 - June 2, 2023
22nd International Conference on Autonomous Agents and Multiagent Systems   *ExCeL London*

Exam Scribe   October 12, 2021 - December 8, 2021
Disability Resource Office   *Raleigh, NC*

Secretary   August 2017 - May 2019
Association for Computing Machinery at Penn State Harrisburg   *Harrisburg, PA*

C++ Competitive Programmer   April 5, 2017
International Collegiate Programming Contest   *Shippensburg University*
- Selected to represent Penn State Harrisburg at the ACM Mid-Atlantic Region Programming Competition

Award Funding

SIGAI Student Travel Grant ($2,000)	October 5, 2023
Intelligent Virtual Agents (IVA) 2023 Conference Travel Grant Program	*Würzburg, Germany*
Student Travel Grant ($1,000)	August 28, 2023
College of Engineering Enhancement Fee Travel Award	*Würzburg, Germany*
Student Travel Grant ($1,000)	April 1, 2023
College of Engineering at North Carolina State University	*London, UK*
AAMAS Student Scholarship (£580)	March 26, 2023
22nd International Conference on AAMAS Scholarship Chairs	*London, UK*
Graduate Merit Award ($3,000)	July 9, 2019
College of Engineering at North Carolina State University	*Raleigh, NC*
Graduate Merit Award ($3,000)	July 9, 2019
College of Engineering at North Carolina State University	*Raleigh, NC*
Graduate Student Support Plan ($\sim$ $48,912/yr.)	August 16, 2019 - May 15, 2023
College of Engineering at North Carolina State University	*Raleigh, NC*
Graduate Merit Award ($3,000)	February 11, 2019
College of Engineering at North Carolina State University	*Raleigh, NC*
Dean's Scholarship ($9,800)	August 2015
Embry-Riddle Aeronautical University Scholarship Committee	*Daytona Beach, FL*

Peer-Reviewed Publications in Academic Journals

1. Mark Abdelshiheed, Robert Moulder, **John Wesley Hostetter**, Tiffany Barnes, and Min Chi. (Invited Submission; Under Review) Reinforcing Deep Reinforcement Learning with Strategy Interventions to Bridge Metacognitive Knowledge Gap. *International Journal of Artificial Intelligence in Education (IJAIED)*

2. Mark Abdelshiheed, Robert Moulder, **John Wesley Hostetter**, Tiffany Barnes, and Min Chi. Example, nudge, or practice? Assessing metacognitive knowledge transfer of factual and procedural learners. *User Modeling and User-Adapted Interaction*, 2024

Peer-Reviewed Publications in Conference Proceedings[1]

1. Md Mirajul Islam, Xi Yang, **John Wesley Hostetter**, Adittya Soukarjya Saha, and Min Chi. A generalized apprenticeship learning framework for modeling heterogeneous student pedagogical strategies. In *Proceedings of the 17th International Conference Proceedings on Educational Data Mining*. EDM, 2024. Full Paper - Presentation, *Acceptance Rate of 25.93% (21/81)*

2. **John Wesley Hostetter**, Mark Abdelshiheed, Tiffany Barnes, and Min Chi. A Self-Organizing Neuro-Fuzzy Q-Network: Systematic design with offline hybrid learning. In *Proceedings of the 22nd International Conference on Autonomous Agents and Multiagent Systems*. AAMAS, International Foundation for Autonomous Agents and Multiagent Systems, 2023. Full Paper - Oral Presentation, *Acceptance Rate of 23.3% (237/1,015 submissions)*

3. **John Wesley Hostetter**, Cristina Conati, Xi Yang, Mark Abdelshiheed, Tiffany Barnes, and Min Chi. XAI to Increase the Effectiveness of an Intelligent Pedagogical Agent. In *Proceedings of the 23rd ACM International Conference on Intelligent Virtual Agents*. IVA, Association for Computing Machinery, 2023. Full Paper - Oral Presentation **(Best Paper Finalist),** *Acceptance Rate of 28.0%*

4. **John Wesley Hostetter** and Min Chi. Latent space encoding for interpretable fuzzy logic rules in continuous and noisy high-dimensional spaces. In *2023 IEEE International Conference on Fuzzy Systems*. FUZZ, IEEE, 2023. Full Paper - Oral Presentation

5. **John Wesley Hostetter**, Mark Abdelshiheed, Tiffany Barnes, and Min Chi. Leveraging fuzzy logic towards more explainable reinforcement learning-induced pedagogical policies on intelligent tutoring systems. In *2023 IEEE International Conference on Fuzzy Systems*. FUZZ, IEEE, 2023. Full Paper - Oral Presentation

6. Mark Abdelshiheed, **John Wesley Hostetter**, Tiffany Barnes, and Min Chi. Leveraging Deep Reinforcement Learning for Metacognitive Interventions across Intelligent Tutoring Systems. In *Proceedings of the 24th International Conference on Artificial Intelligence in Education*. AIED, Springer International Publishing, 2023. Full Paper - Oral Presentation **(Best Paper Finalist),** *Acceptance Rate of 21.11% (53/251)*

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[1]EDM and AIED as well as FUZZ IEEE are premier conferences in Computer Science Education and Fuzzy Logic, respectively.

7. Mark Abdelshiheed, **John Wesley Hostetter**, Tiffany Barnes, and Min Chi. Bridging declarative, procedural, and conditional metacognitive knowledge gap using deep reinforcement learning. In *45th Annual Conference Proceedings of the Cognitive Science Society*, 2023. Full Paper - Oral Presentation **(Winner of Travel Grant Award based on Paper Quality),** *Acceptance Rate of 17.0% (155/875)*

8. Mark Abdelshiheed, **John Wesley Hostetter**, Preya Shabrina, Tiffany Barnes, and Min Chi. The power of nudging: Exploring three interventions for metacognitive skills instruction across intelligent tutoring systems. In *44th Annual Conference Proceedings of the Cognitive Science Society*, volume 44, 2022. Full Paper - Oral Presentation **(Winner of Diversity & Inclusion Award),** *Acceptance Rate of 27.0% (205/762)*

9. Mark Abdelshiheed, **John Wesley Hostetter**, Xi Yang, Tiffany Barnes, and Min Chi. Mixing backward-with forward-chaining for metacognitive skill acquisition and transfer. In *International Conference on Artificial Intelligence in Education*, pages 546–552. AIED, Springer, 2022. Oral Presentation, *Acceptance Rate of 20.0% (40/197)*

PUBLISHED PYPI PACKAGES (SOLE OWNER & DEVELOPER)

manim-timeline | `manim-slides, igraph` | *pypi.org/p/manim-timeline*   **2024 - Present**
- A seamless and elegant timeline for rapid presentation of related literature

manim-beamer | `manim-slides` | *pypi.org/p/manim-beamer*   **2024 - Present**
- Emulate LaTeX beamer in Python to animate technical and professional slides

regime | `igraph` | 754 LOC w/ 99% cov. | *pypi.org/p/regime*   **2024 - Present**
- Lightweight MLOps; inspect, visualize, validate workflows & hyperparameters

rough-theory | `igraph` | 1.8k LOC w/ 85% cov. | *pypi.org/p/rough-theory*   **2021 - Present**
- Leverage discernibility to identify core knowledge (e.g., cut provably irrelevant attributes)

fuzzy-theory | `PyTorch, igraph` | 3.6k LOC w/ 93% cov. | *pypi.org/p/fuzzy-theory*   **2020 - Present**
- Transparent approximate reasoning via neuro-fuzzy networks, fuzzy sets & fuzzy logic operations

fuzzy-ml | `PyTorch, rpy2, skorch` | 3.3k LOC w/ 75% cov. | *pypi.org/p/fuzzy-ml*   **2020 - Present**
- Fuzzy clustering, linguistic summaries and association analysis of temporal quantitative databases

OPEN-SOURCE PROJECTS (SOLE OWNER & DEVELOPER)

PolicyPrep | `PyTorch, d3rlpy` | 3.9k LOC | *github.com/johnHostetter/PolicyPrep*   **2023-2024**
- Configurable MLOps for offline reinforcement learning in e-learning; saves ∼1-2 months annually

Fuzzy Conservative Q-Learning Demo | `PyTorch` | *zenodo.org/records/7668308*   **2023**
- A self-organizing, transparent neuro-fuzzy network; published in AAMAS 2023

Neuro-Symbolic AI | `Numpy` | *github.com/johnHostetter/Soft-Computing*   **2020-2022**
- Neuro-symbolic AIs (e.g., genetic fuzzy systems) and soft computing operations

and at least 4 more related to neuro-symbolic AI (e.g., GPFRL, GARIC, Kohonen, SaFIN)

CLOSED-SOURCE PROJECTS († INDICATES SOLE OWNER & DEVELOPER)

PySoft[†] | `sb3, d3rlpy, wandb` | 3.5k LOC w/ 87% cov. | *hostetter-lab.github.io/PySoft*   **2020-Present**
- Reinforcement & supervised learning of neuro-symbolic networks in PyTorch
- Supports `d3rlpy, stable-baselines3 (sb3), skorch, rpy2, sympy, wandb`, etc. for rapid prototyping

HepiusApp | `C#, Xamarin` | *ronak1997.github.io/Hepius/*   **2019**
- Built a mobile app to research smartphone use in healthcare decisions for Osteoporosis
- Supervised clinical trials led by Dr. Russell Kirkscey, Dr. Edward Fox, and Dr. Hien Nguyen
- **Transferred intellectual property to Penn State Research Foundation**
- Led to and featured in at least 2 publications:
  1. Russell Kirkscey. Development and patient user experience evaluation of an mhealth informational app for osteoporosis. *International Journal of Human–Computer Interaction*, 38(8):707–718, 2022
  2. Russell Kirkscey. mhealth apps for older adults: A method for development and user experience design evaluation. *Journal of Technical Writing and Communication*, 51(2):199–217, 2021

REFERENCES

1. Min Chi (`mchi@ncsu.edu`, 919-515-7825), Professor
2. James Lester (`lester@ncsu.edu`, 919-515-7534), Goodnight Distinguished University Professor in Artificial Intelligence and Machine Learning & Director of the Center for Educational Informatics
3. Tiffany Barnes (`tmbarnes@ncsu.edu`, 919-515-5764), Distinguished Professor
4. Travis Martin (`tmmarti5@ncsu.edu`, 919-559-0299), AI Academy Instructor [Teaching Reference]