Amazon-Illinois Center on AI for Interactive Conversational Experiences (AICE)

First Call for PhD Fellowship Nominations 2025-2026
Proposal Due: April 30, 2025

1. INTRODUCTION

The Amazon-Illinois Center on AI for Interactive Conversational Experiences (AICE) is a collaboration between Amazon and the University of Illinois Urbana-Champaign, to revolutionize the paradigm and develop intelligent conversational systems that can automatically acquire, create, validate, reason, and update their knowledge through multimodal interactions with data and human users. The AICE Center is calling for the 2025-2026 PhD Fellowship Nominations to recognize outstanding PhD students doing exceptional work at Illinois. In this second phase, the center will support approximately two PhD fellows among a wide range of cutting-edge research areas, including but not limited to:

1. **Foundation Model Improvements**
   o Novel model architectures
   o Novel training algorithms and methodologies
   o Multi-modal (e.g., text, image, video, audio) understanding and generation
   o Multi-lingual understanding and generation
   o Algorithms and workflows for acquiring and curating high-quality and diverse datasets for training
2. **Foundation Model Evaluation**
   o Creation of new benchmarks for assessing foundation model capabilities
   o Methodologies for robust evaluation of generative AI systems, including agents
3. **Efficient Generative AI**
   o Efficient training and inference for cloud and on-device applications
   o Compute and memory efficient handling of multi-modal long/infinite context
   o Improving efficiency of diffusion models, including discrete diffusion
4. **Reasoning**
   o Commonsense and domain-specific (e.g., math, coding) reasoning
   o Temporal and spatial reasoning
   o Reasoning for planning
5. **Knowledge Grounding**
   o Approaches to ground (multi-modal) generation on up-to-date world, domain-specific, enterprise, or personal knowledge
   o Memory-augmented generative AI systems
6. **Agentic AI**
   o Creation of autonomous systems capable of performing tasks, making decisions, and interacting with their environments
   o Multi-Agent systems and agent orchestration framework improvements
   o Customization and continual improvement of agents post deployment
   o Internationalizing agentic systems

7. **Responsible Generative AI**
   - o Red teaming (e.g., advanced red teaming approaches, automated red teaming for multi-modal models)
   - o Improvement of foundation model RAI performance (e.g., robustness to jailbreaking and membership inference attacks; watermarking approaches; deepfake detection)
   - o Responsible agentic AI (e.g., robustness of multi-agent systems, adherence to guardrails)
8. **Applications of Generative AI**
   - o Systems that leverage Generative AI for advancing science and technology in areas such as physics, mathematics, chemistry, biology, hardware design, materials science, engineering, economics, healthcare, climate.

2. AWARD AMOUNT

The fellowship offers 9 months support (Fall 2025 – Spring 2026). The fellowship value is approximately $60k and the funds will be paid to the awardee's home department to cover the costs of:

- 9-month 50% GRA stipend at the departmental prevailing rate
- Tuition waiver in the form of tuition remission paid to the university
- Up to $5K in travel support funds

Through the PhD fellowships, AICE will also provide awardees opportunities to collaborate with Amazon scientists and apply for summer internships at Amazon.

3. ELIGIBILITY

- Be a full-time doctoral student in the 3rd year or higher of a PhD program at University of Illinois Urbana-Champaign, pursuing research in one of the topical areas listed above or related areas.
- Have passed their home department's required PhD qualifying exams.
- Have a faculty member serving as PhD thesis advisor.
- Remain an active, full-time student in a PhD program during the fellowship period.
- Students that are already supported by another industry-sponsored fellowship are not eligible.
- Students of any citizenship/nationality are eligible.

4. EVALUATION CRITERIA

Applications are evaluated on the following criteria:

- Significance of the research problem: how important is the problem described, including limitations of state-of the-art and prior work?
- Novelty: what are the key contributions and innovations of the proposed research? What makes the candidate's research unique and outstanding?

- Relevance: how well aligned is the proposed research to AICE center's research themes?
- Broader Impact: what potential impact will the proposed research have on the broader research community and society?
- Leadership potential: to what degree is the candidate likely to succeed in the field based on their vision on future research directions and future career goals?

5. APPLICATION

Please provide:
- Research proposal that includes a comprehensive description of the research problems the candidate is pursuing, long-term and short-term goals and motivations, proposed innovative solutions, past related research achievement, potential impact, future directions and any plans of where the candidate's research is going.
- The technical proposal must be in Times New Roman, 12-point font, single spaced, with one-inch margins. It should not exceed three pages, with unlimited references. Please include your name and email under the title. File naming convention is to follow: firstname_lastname_title.zip
- CV/Resume, up to 4 pages
- Reference letter from your thesis advisor, up to 3 pages, commenting on your research achievement and impact, describing your capacity to do original research and your potential as a future leader in the field. The letter should be sent by your thesis advisor directly to aice-management@lists.cs.illinois.edu, using the file name (candidate's) firstname_lastname_letter.pdf
- Optional: Link to most recent published work

3. IMPORTANT DATES

- Proposal Submission Deadline: 11:59pm CT April 30, 2025
- Acceptance Notification: Early July 2025
- On Campus AICE Center Symposium: TBD September 2025

4. SUBMISSION AND CONTACT INFORMATION

A zip file should be uploaded to Link in a single package with the following file naming convention: firstname_lastname_title.zip. For questions about the proposal submission process, please contact [aice-management@lists.cs.illinois.edu]. For questions about the AICE Center, please contact the center director Prof. Heng Ji [hengji@illinois.edu] or leadership team: [aice-leadership@lists.cs.illinois.edu]

5. AICE LEADERSHIP TEAM
- Director: Heng Ji (Illinois)
- Center Liaison: Ruhi Sarikaya (Amazon)
- Principal Program Manager: Rajiv Dhawan (Amazon)
- Project Manager: Kathleen Allen (Amazon)
- Center Alliance Manager: Akshay Mulera (Illinois)

- Advisory board members: Julia Hockenmaier (Illinois), Derek Hoiem (Illinois), Angeliki Metallinou (Amazon), Pradeep Natarajan (Amazon), Kevin Small (Amazon), Lav Varshney (Illinois)