

## David H. Ménager, Ph.D.

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### Reserach Statement

I'm a senior AI research scientist specializing in human-like decision-making systems that reason, learn, and act under uncertainty. I've served as a DARPA principal investigator, shaping, winning, and leading funded research programs. And I turn foundational AI research into trustworthy autonomous systems, decision support aids, and analytic tools. I'm excited about roles where I can both shape ambitious technical visions and execute them end-to-end.

### Education

- 2015–2021\*    **Ph.D.**, Computer Science, The University of Kansas
- **Dissertation title:** Event Memory for Intelligent Agents
  - **Advisors:** [Dr. Dongkyu Choi](#), [Dr. Arvin Agah](#)
- 2015-2018    **M.S.**, Computer Science, The University of Kansas
- **Thesis title:** Episodic Memory: Foundation of Explainable Autonomy
  - **Advisor:** [Dr. Dongkyu Choi](#)
- 2011-2015    **B.Sc.** Computer Science, The University of Kansas

### Research Experience

- 2022–        AI Research Scientist, [AI and Autonomy Group](#), Parallax Advanced Research
- Supervisor** [Dr. Matthew Molineaux](#)
- Designed and managed a \$300,000 initiative developing a paradigm-shifting approach to modeling complex, non-ergodic social systems.
  - Technical lead for the decision-analysis component of a DARPA In The Moment (ITM) TA2 system
  - Developed goal-reasoning and planning components of a DARPA SCEPTER system, supporting autonomous decision-making in the context of course of action analysis
  - Center for Autonomous Air Mobility and Sensing Advisory Board Member
  - Lead and coordinate the development of research proposals
  - Author research papers, leading to publications in the *International Conference on Case-Based Reasoning*, and *Advances in Cognitive Systems*
  - Disseminate research findings through presentations at leading conferences and publications in prestigious journals
  - Cultivate and maintain relationships with funding agencies
  - Serve on advisory boards and committees to provide expert guidance and contribute to the broader scientific community

- 2017 Naval Research Enterprise Intern, [Naval Research Laboratory](#)  
**Supervisor** [Dr. David W. Aha](#)
- Build a learning agent capable of acquiring action and event models from episodic traces within the context of a cognitive architecture
  - Extend a theory of episodic memory for intelligent agents, addressing mechanisms of skill acquisition and learning
  - Design and execute experiments to evaluate the proposed theory, utilizing the game Minecraft and two additional simulated environments
  - Publish the research findings and disseminated them in an academic conference
- 2016 Student Contractor, [Naval Research Laboratory](#)  
**Supervisor** [Dr. David W. Aha](#)
- Design and implement a case-based plan recognition system to enable intelligent agents to autonomously identify and react to changing situations and goals from partial observations of the state and actions
  - Investigate methods to enhance case-based plan recognition capabilities in dynamic partially observable environments
  - Design and conduct experiments to evaluated the implemented agent in a military domain
  - Publish the research findings and disseminated them in an academic conference
- 2015–2021 Research Assistant, [Cognitive Control Systems Laboratory](#)  
**Principal Investigator** [Dr. Dongkyu Choi](#)
- Conduct in-depth research and analysis on cognitive architecture contributing a novel theory and computational model of event memory for intelligent agents
  - Author and research papers leading to publications in *Cognitive Systems Research*, *Minds and Machines*, and the *Cognitive Science Society*
  - Disseminate research findings at top conferences in artificial intelligence
  - Assist in the preparation and submission of research proposals
  - Collaborate with a multidisciplinary team of researchers to develop and refine research objectives and methodologies
  - Participate in lab meetings and contributed to the development of research strategies and goals
  - Mentor and supervise undergraduate students, providing guidance on research projects and laboratory techniques

## Other Experience

- 2021-2022 Sr. AI/ML Engineer, Advanced Development Programs, [Lockheed Martin](#)
- Develop machine learning-based capability for hypersonic missile defense
  - Implement anomaly detection software tools for critical F-35 subsystems
  - Develop AI-based search algorithms for autonomous agents
- 2018 Intern, Advanced Development Programs, Lockheed Martin
- Leveraged big data and advanced techniques for prognostic health management on aerial platforms

- 2015 Data Analyst University Intern, Creative Cloud, [Adobe](#)
- Apply predictive analytics to Creative Cloud Product Usage Data
  - Mine Product Usage Data from Hadoop to understand usage patterns
  - Utilize machine learning techniques to develop algorithms to predict user conversion and retention based on product usage
  - Conduct cluster analysis to identify customer segments in Creative Cloud Products
- 2015 University of Kansas Chapter President, [National Society of Black Engineers](#)
- Under my leadership, our chapter was awarded the Regional and National Small Chapter of the Year awards
- 2012-2013 Software Engineering Intern, Portable Navigation Devices, [Garmin](#)
- Maintain and updated existing portable navigation devices
  - Conduct peer code reviews to ensure compliance to coding standards
  - Engineer critical bug fixes to Garmin GPS systems on all software levels

## Awards & Honors

### Awarded Proposals and Grants

- 2025 Cognitive Learning and Adaptation through Inference and Rigorous Validation Of hYpotheses with Applications to Non-ergodic Trajectories (CLAIRVOYANT)
- **Principal Investigator:** Dr. David H. Ménager
  - **Key Personnel:** [Dr. Othalia Larue](#)
  - Submitted to the [Defence Advanced Research Projects Agency \(DARPA\)](#)
  - **Award Amount:** \$300,000
  - Proposed to develop a paradigm-shifting approach to modeling complex, non-ergodic social systems.
  - Our approach is theoretically grounded in Cognitive Psychology, discovers latent factors governing observed behavior of population segments, quantifies limits of inference over data sources, and generalizes across contexts to handle changing system dynamics.
- 2024 Cooperative Reasoning of UAVs in Multi-Objective Missions using Shared Event Memory
- **Principal Investigator:** [Dr. Cammy Peterson](#)
  - **Key Personnel:** Dr. David H. Ménager
  - **Award Amount:** \$20,000
  - Award funded by the [Center for Autonomous Air Mobility and Sensing](#)
  - Leveraged shared event memory to enable a team of UAVs to reason over sensed information to infer the state of a complex environment and the actors operating within it.
  - The shared memory system uses generative models to learn how actors behave and predict behavior over time.
  - Cooperating UAVs used estimated state to make decisions and drive group behavior.

- 2024 Internal Research and Development Award
- **Principal Investigator:** David H. Ménager
  - **Award Amount:** \$90,000
  - Award funded by Parallax Advanced Research
  - Developed a novel sample-efficient imitation learning method using event memory of Bayesian generative models.
  - Implemented a novel method for the discovery of latent variables in probabilistic graphical models.
  - Developed a goal reasoning, event memory-enabled ground robot capable of learning and refining a domain theory from experience to respond to unknown unknowns.
- 2022 Internal Research and Development Award
- **Principal Investiagor:** David H. Ménager
  - **Award Amount:** \$90,000
  - Developed event memory-enabled agent capable of leveraging past experiences to perform state estimation in partially observed environments.
  - Investigated event memory for long-duration autonomy

## Travel Awards

- 2019 University of Kansas Graduate Engineering Associate Travel Award (\$190)
- 2019 Center for Issues in Philosophy of Memory Travel Award (€300)
- 2018 International Conference on Case-Based Reasoning Travel Award (\$850)

## Fellowships & Scholarships

- 2016-2020 [Self Graduate Fellow](#) (\$120,000)
- Self Graduate Fellows are selected on the basis of their academic ability and achievements, leadership attributes, vision, and motivation to make significant contributions in their fields and in society
  - It provides general education and training in communication, management, innovation, and leadership
  - The development program includes individual coaching in oral and written communication, week-long skill sessions, a yearly symposium, luncheons, and a four-day government and science policy seminar in Washington, D.C.
- 2016 [Rusty Leffel Concerned Student Award](#) (\$1,000)
- In recognition of demonstrated concern for furthering the ideals of the University of Kansas and of higher education.
- 2015-2020 [National GEM Consortium Fellow](#) (\$16,000)
- Awarded to select highly qualified underrepresented students looking to pursue Master's and Doctoral degrees in applied science and engineering.
  - Sponsored by Adobe Inc. to complete one summer internship.
- 2013-2015 [Self Engineering Leadership Fellow](#) (\$32,000)
- Awarded to select passionate engineering and computer science students who are strongly goal-oriented and who bring the business skills and vision needed to guide the technology-based corporations of tomorrow.

## Research Interests

- Models of episodic memory
- Probabilistic reasoning
- Cognitive architecture
- Concept formation
- Bayesian Networks
- Machine learning
- Rule induction
- Causal discovery
- Problem solving and reasoning
- Constraint satisfaction
- Explanation generation
- Interpretable models
- Case-based reasoning
- Analogy
- Recommender systems
- Similarity measures
- Intelligent agents
- Human-like learning

## Publications

 [Google Scholar](#)

## Journal Articles

- J1. **Ménager, David H.**, Choi, D. & Robins, S. K. Modeling human memory phenomena in a hybrid event memory system. *Cognitive Systems Research* (2022).
- J2. **Ménager, David H.**, Choi, D. & Robins, S. K. A hybrid theory of event memory. *Minds and Machines*, 1–30 (2021).

## Peer-reviewed Conference Proceedings

- C1. Molineaux, M., Weber, R. O., Floyd, M. W., **Ménager, David**, Larue, O., Addison, U., Kulhanek, R., Reifsnyder, N., Rauch, C., Mainali, M., *et al.* Aligning to human decision-makers in military medical triage in *International Conference on Case-Based Reasoning* (2024), 371–387.
- C2. Sen, A., Mainali, M., Rauch, C. B., Addison, U., Floyd, M. W., Goel, P., Karneeb, J., Kulhanek, R., Larue, O., **Ménager, David**, *et al.* Counterfactual-Based Synthetic Case Generation in *International Conference on Case-Based Reasoning* (2024), 388–403.
- C3. Kent, J. S. & **Ménager, David H.** Indecision trees: learning argument-based reasoning under quantified uncertainty in *Synthetic Data for Artificial Intelligence and Machine Learning: Tools, Techniques, and Applications* **12529** (2023), 296–307.
- C4. **Ménager, David H** & Choi, D. Hybrid Event Memory as a Case Base for State Estimation in Cognitive Agents in *International Conference on Case-Based Reasoning* (2023), 134–149.
- C5. **Ménager, David**. Episodic Memory Foundation of Explainable Autonomy in *Proceedings of the Twenty-Sixth International Conference on Case-Based Reasoning* (Stockholm, Sweden, 2018), 32–41.
- C6. **Ménager, D** & Choi, D. A Robust Implementation of Episodic Memory for a Cognitive Architecture in *Proceedings of the Thirty-Eighth Annual Meeting of the Cognitive Science Society* (2016).

## Workshop Papers

- W7. Floyd, M. W., Leake, **Ménager, David H**, Watson, I. & Wilkerson, K. *Levels of AI Memory—And Case-Based Ways for LLMs to Ascend Them in 2nd Workshop on Case-Based Reasoning and Large Language Model Synergies (CBR-LLM)* (2025).
- W8. Rauch, C. B., Addison, U., Floyd, M., Goel, P., Karneeb, J., Kulhanek, R., Larue, O., **Ménager, David**, Mainali, M., Molineaux, M., *et al.* *Algorithmic Decision-Making in Difficult Scenarios in Proceedings of the AAAI Symposium Series 3* (2024), 583–585.
- W9. **Ménager, David H**, Choi, D., Roberts, M. & Aha, D. W. *Learning Planning Operators from Episodic Traces.* in *AAAI Spring Symposia* (2018).
- W10. **Ménager, David Henri**, Choi, D., Floyd, M. W., Task, C. & Aha, D. W. *Dynamic Goal Recognition Using Windowed Action Sequences in Workshops at the Thirty-First AAAI Conference on Artificial Intelligence* (San Francisco, California, 2017).
- W11. **Ménager, David**. *Episodic Memory in a Cognitive Model in Proceedings of the Twenty-Fourth International Conference on Case-Based Reasoning* (Atlanta, GA, 2016), 267–271.

## Public Scholarship

- P1. Bach, K., Bergmann, R., Brand, F., Caro-Martínez, M., Eisenstadt, V., W. Floyd, M., Jayawardena, L., Leake, D., Lenz, M., Malburg, L., **Ménager, David, H.**, Minor, M., Schack, B., Watson, I., Wilkerson, K. & Wiratunga, N. *Case-Based Reasoning Meets Large Language Models: A Research Manifesto For Open Challenges and Research Directions* working paper or preprint. Mar. 2025. <https://hal.science/hal-05006761>.

## Tools & Software

 [Github](#)

## Research Projects

**Hybrid Event Memory System:** An implementation of the Hybrid Event Memory System (HEMS) by Ménager, David H., Choi and Robins. HEMS performs clustering and classification of Bayesian networks to enable event cognition for intelligent agents. It stores observations, represented as DAGs, at the lowest level of an event hierarchy, and learns generalizations on top of them to form a probabilistic taxonomy of events. Learning occurs in an online, and incremental fashion, so the system learns continually, forming new generalizations by composing pre-existing ones together. Learning and performance are interleaved, so predictive power improves as examples are encountered.

**ICARUS:** A Common Lisp implementation of Choi and Langley’s ICARUS cognitive architecture with an integrated event memory. The architecture places strong emphasis on goal-driven embodied cognition by supporting higher-level symbolic structures featuring numerical attributes that make contact with sensed environmental elements. ICARUS separates conceptual knowledge from procedural, although procedural definitions depend on conceptual state descriptors. The architecture operates within recognize-act cycles, whereby conceptual inference is the foundational operation that enables goal reasoning, event cognition, skill execution, and learning.

## Presentations

### Invited Talks

- T1. **Ménager, David H.** *Artificial Intelligence: A Practical Introduction* Defense Innovation Unit OnRamp Hub AI Lecture Series (Dayton, OH, USA). Apr. 2027.
- T2. **Ménager, David H.** *A Hybrid Theory of Event Memory* Purdue University Midwest Memory Mayhem Workshop (West Lafayette, IN, USA). Apr. 2024.
- T3. **Ménager, David H.** *The Trusted Algorithmic Delegate: A Research Story in Responsible Innovation* Utah State University Spring Symposium on Ethics and AI (Logan, UT, USA). Mar. 2024.

## Selected Media Coverage

- 2024 Ohio Business Magazine, [Competitive AI \[C1\]](#)
- 2024 Kansas Alumni Magazine, [Ripple effect: KU's Self Graduate Fellowship](#)

## Academic Advising and Mentoring

### Graduate

- 2025 Daric Meyers (Masters student), Brigham Young University, Cooperative Reasoning of UAVs in Multi-Objective Missions using Shared Event Memory
- 2024 Saugat Aryal (Ph.D student), University College Dublin, Semi-factual Explanations in AI, ICCBR 2024 Doctoral Consortium mentor

### Undergraduate

- 2020 Xavier Scherschligt, University of Kansas, Predicting Glioblastoma Multiform, Undergraduate research mentor
- 2016 Denzel Richmond, University of Kansas, Online Pong game domain, Undergraduate research mentor

## Academic Service

### Committees and Advisory Boards

- 2025 [International Conference on Case-Based Reasoning](#). Program committee member
- 2025 AI Workshop for the Air Force Research Laboratory 711th Human Performance Wing. Organizer
- 2024 [International Conference on Case-Based Reasoning](#). Program committee member
- 2022- [Center for Autonomous Air Mobility and Sensing](#). Industry Member

2021- [University of Kansas School of Engineering Diversity Equity, Inclusion, and Belonging Advisory Board](#). Board member

### **Conference Reviewer**

2025 [International Conference on Case-Based Reasoning](#)

2018 [Plan Activity and Intention Recognition Workshop \(AAAI\)](#)

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