

Nikhil Krishnaswamy

<https://www.nikhilkrishnaswamy.com>

Areas of Specialization

Artificial Intelligence; Computational Linguistics/Natural Language Processing; Machine Learning; Human-Computer Interaction; Simulation; Computer Graphics; Spatial Cognition and Reasoning.

Appointments Held

2020-present *Assistant Professor of Computer Science*, Colorado State University, Fort Collins, CO, USA

2017-2020 *Postdoctoral Associate*, Brandeis University, Waltham, MA, USA

Education

2017 PhD in Computer Science, Brandeis University, Waltham, MA, USA
Advisor: Prof. James Pustejovsky

2013 MA in Computational Linguistics, Brandeis University, Waltham, MA, USA

2010 BS in Computer Games Development, DePaul University, Chicago, IL, USA

Research Experience

2017-2020 *Postdoctoral Associate*, Brandeis University, Waltham, MA, USA

- DARPA-funded research and development in natural language understanding, artificial intelligence, and human-computer interaction.
- Project manager for lab work on DARPA Communicating With Computers (CwC) program, including grant and monthly report writing, running evaluations, packaging software and deliverables, and managing student research assistants and collaborators across multiple sites.

2013-2017 *Graduate Research Fellow*, Brandeis University, Waltham, MA, USA

Teaching Experience

2021 (upcoming) Instructor, Multimodal Communication with Robots and Computational Agents. Tutorial, Language Resources and Evaluation Conference (LREC). Marseille, France. May, 2020.

2018-2020 Staff tutor, Computational Linguistics Master's program. Brandeis University.

- Tutored MS students in depth on coursework in multiple courses, including COSI 114: Fundamentals of Computational Linguistics, and COSI 134: Statistical Approaches to

Natural Language Processing.

- 2017 Instructor, Building Multimodal Simulations for Natural Language. Tutorial, European Chapter of the Association for Computational Linguistics (EACL). Valencia, Spain. April, 2017.
- 2016 Teaching fellow, COSI 112: Modal, Temporal, and Spatial Logic. Brandeis University. August–December, 2016.
Teaching fellow, COSI 114: Fundamentals of Computational Linguistics. Brandeis University. January–May, 2016.
- 2015 Teaching fellow, COSI 114: Fundamentals of Computational Linguistics. Brandeis University. January–May, 2015.
- 2014 Teaching fellow, COSI 135: Computational Semantics. Brandeis University. August–December, 2014.
Teaching fellow, COSI 139: Machine Translation. Brandeis University. January–May, 2014.
- 2013 Teaching fellow, COSI 112: Modal, Temporal, and Spatial Logic. Brandeis University. August–December, 2013.

Employment

- 2011–2015 Software Engineer, Lockheed Martin Mission Systems & Training, Burlington, MA, USA
• Training simulator development for government and industry clients, including DARPA ALIAS program, ONR/USMC AITT & HCO-LSE programs.
- 2011 Game Programmer, Avalinx Studios, Dublin, OH, USA

Doctoral Thesis

- 2017 Krishnaswamy, N. (2017). *Monte-Carlo Simulation Generation Through Operationalization of Spatial Primitives*. PhD thesis, Brandeis University.
• Created VoxSim semantic event simulator and VoxML visual modeling language (now under development as an ISO standard).

Book Chapters

- 2018 Krishnaswamy, N. and Pustejovsky, J. (2018). Deictic Adaptation in a Virtual Environment. In *Spatial Cognition XI: International Conference on Spatial Cognition*. Springer.
- 2016 Krishnaswamy, N. and Pustejovsky, J. (2016). Multimodal Semantic Simulations of Linguistically Underspecified Motion Events. In *Spatial Cognition X: International Conference on Spatial Cognition*. Springer.

Conference Proceedings

- 2020 Krishnaswamy, N. and Pustejovsky, J. (2020). Neurosymbolic AI for Situated Language Understanding. In *Annual Conference on Advances in Cognitive Systems (ACS)*. Cognitive Systems Foundation.
- Krishnaswamy, N. and Pustejovsky, J. (2020). A Formal Analysis of Multimodal Referring Expressions Under Common Ground. In *International Conference on Language Resources and Evaluation (LREC)*. ACL.
- Krishnaswamy, N., Narayana, P., Bangar, R., Rim, K., Patil, D., McNeely-White, D., Ruiz, J., Draper, B., Beveridge, R., and Pustejovsky, J. (2020). Diana’s World: A Situated Multimodal Interactive Agent. In *AAAI Conference on Artificial Intelligence (AAAI): Demos Program*. AAAI.
- Pustejovsky, J. and Krishnaswamy, N. (2020). Embodied Human-Computer Interactions through Situated Grounding. In *International Conference on Intelligent Virtual Agents (IVA)*. ACM.
- Hutchens, M., Krishnaswamy, N., Cochran, B., , and Pustejovsky, J. (2020). Jarvis: A Multimodal Visualization Tool for Bioinformatic Data. In *International Conference on Human-Computer Interaction (HCI): Late-Breaking Papers*. Springer.
- Krajovic, K., Krishnaswamy, N., Dimick, N. J., Salas, R. P., and Pustejovsky, J. (2020). Situated Multimodal Control of a Mobile Robot: Navigation through a Virtual Environment. In *Special Session on Situated Dialogue with Virtual Agents and Robots (RoboDIAL): Late-Breaking Papers*. Non-archival.
- Pustejovsky, J., Krishnaswamy, N., Beveridge, R., Ortega, F. R., Patil, D., Wang, H., and McNeely-White, D. (2020). Interpreting and Generating Gestures with Embodied Human-Computer Interactions. In *Workshop on Generation and Evaluation of Non-Verbal Behaviour for Embodied Agents (GENEA)*. ACM.
- 2019 Krishnaswamy, N. and Pustejovsky, J. (2019). Generating a Novel Dataset of Multimodal Referring Expressions. In *International Workshop on Computational Semantics (IWCS)*. ACL.
- Krishnaswamy, N., Friedman, S., and Pustejovsky, J. (2019). Combining Deep Learning and Qualitative Spatial Reasoning to Learn Complex Structures from Sparse Examples with Noise. In *AAAI Conference on Artificial Intelligence (AAAI)*. AAAI.
- Krishnaswamy, N. and Pustejovsky, J. (2019). Situated Grounding Facilitates Multimodal Concept Learning for AI. In *Visually Grounded Interaction and Language Workshop (ViGIL)*. Neural Information Processing Systems Foundation.
- Krishnaswamy, N. and Pustejovsky, J. (2019). Multimodal Continuation-style Architectures for Human-Robot Interaction. In *Workshop on Cognitive Vision: Integrated Vision and AI for Embodied Perception and Interaction*. Cognitive Systems Foundation.
- Pustejovsky, J. and Krishnaswamy, N. (2019). Situational Grounding within Multimodal Simulations. In *AAAI Workshop on Games and Simulations in AI (GameSim)*. AAAI.
- McNeely-White, D., Ortega, F., Beveridge, R., Draper, B., Bangar, R., Patil, D., , Pustejovsky, J., Krishnaswamy, N., Rim, K., Ruiz, J., and Wang, I. (2019). User-Aware Shared Perception for Embodied Agents. In *International Conference on Humanized Computing*

- and Communication (HCC)*. IEEE.
- 2018 Krishnaswamy, N. and Pustejovsky, J. (2018). An Evaluation Framework for Multimodal Interaction. In *International Conference on Language Resources and Evaluation (LREC)*. ACL.
- Krishnaswamy, N., Do, T., and Pustejovsky, J. (2018). Learning Actions from Events Using Agent Motions. In *Workshop on Annotation, Recognition and Evaluation of Actions (AREA)*. ACL.
- Pustejovsky, J. and Krishnaswamy, N. (2018). The Role of Event Simulation in Spatial Cognition. In *Workshop on Models and Representations in Spatial Cognition (MRSC)*. Springer.
- Pustejovsky, J. and Krishnaswamy, N. (2018). Every Object Tells a Story. In *Workshop on Events and Stories in the News (EventStory)*. ACL.
- Narayana, P., Krishnaswamy, N., Wang, I., Bangar, R., Patil, D., Mulay, G., Rim, K., Beveridge, R., Ruiz, J., Pustejovsky, J., and Draper, B. (2018). Cooperating with Avatars Through Gesture, Language and Action. In *Intelligent Systems Conference (IntelliSys)*. IEEE.
- Do, T., Krishnaswamy, N., Rim, K., and Pustejovsky, J. (2018). Multimodal Interactive Learning of Primitive Actions. In *AAAI Fall Symposium: Artificial Intelligence for Human-Robot Interaction*. AAAI.
- Do, T., Krishnaswamy, N., and Pustejovsky, J. (2018). Teaching Virtual Agents to Perform Complex Spatial-Temporal Activities. In *AAAI Spring Symposium: Integrating Representation, Reasoning, Learning, and Execution for Goal Directed Autonomy*. AAAI.
- 2017 Krishnaswamy, N., Narayana, P., Wang, I., Rim, K., Bangar, R., Patil, D., Mulay, G., Ruiz, J., Beveridge, R., Draper, B., and Pustejovsky, J. (2017). Communicating and Acting: Understanding Gesture in Simulation Semantics. In *International Workshop on Computational Semantics (IWCS)*. ACL.
- Krishnaswamy, N. and Pustejovsky, J. (2017). Do You See What I See? Effects of POV on Spatial Relation Specifications. In *International Workshop on Qualitative Reasoning (QR)*. AAAI/International Joint Conferences on Artificial Intelligence.
- Pustejovsky, J., Krishnaswamy, N., Draper, B., Narayana, P., and Bangar, R. (2017). Creating Common Ground Through Multimodal Simulations. In *Workshop on Foundations of Situated and Multimodal Communication (FSMC)*. ACL.
- Pustejovsky, J., Krishnaswamy, N., and Do, T. (2017). Object Embodiment in a Multimodal Simulation. In *AAAI Spring Symposium: Interactive Multisensory Object Perception for Embodied Agents*. AAAI.
- 2016 Krishnaswamy, N. and Pustejovsky, J. (2016). VoxSim: A Visual Platform for Modeling Motion Language. In *International Conference on Computational Linguistics (COLING): Technical Papers*. ACL.
- Pustejovsky, J., Krishnaswamy, N., Do, T., and Kehat, G. (2016). The Development of Multimodal Lexical Resources. In *Workshop on Grammar and the Lexicon (GramLex)*. ACL.
- Pustejovsky, J. and Krishnaswamy, N. (2016). Visualizing Events: Simulating Meaning

in Language. In *Annual Meeting of the Cognitive Science Society (CogSci)*. Cognitive Science Society.

Pustejovsky, J. and Krishnaswamy, N. (2016). VoxML: A Visualization Modeling Language. In *International Conference on Language Resources and Evaluation (LREC)*. ACL.

Do, T., Krishnaswamy, N., and Pustejovsky, J. (2016). ECAT: Event Capture Annotation Tool. In *International Workshop on Semantic Annotation (ISA)*. ACL.

2014 Pustejovsky, J. and Krishnaswamy, N. (2014). Generating Simulations of Motion Events from Verbal Descriptions. In *Lexical and Computational Semantics (*SEM)*. ACL.

Invited Talks

2018 Krishnaswamy, N. (2018). Grounded Linguistic Interaction in Multimodal Environments. Colorado State University Computer Vision Seminar Series.

2015 Krishnaswamy, N. (2015). Inside the Language Technology Revolution. San Juan College Technology Leadership Conference.

Advising/Supervision

2018 Reader, Storozum, J. (2018). Opposites Attract—Or Do They?: Investigating Negated Verbs in Distributional Semantic Space. Master’s thesis, Brandeis University.

Service to the Field

2021 Program committee, AAAI Conference on Artificial Intelligence (AAAI). Virtual meeting (Hosted: San Francisco, CA, USA).

Program committee, Language Grounding to Vision, Robotics and Beyond track, Meeting of the European Chapter of the Association for Computational Linguistics (EACL). Kiev, Ukraine.

Program committee, Workshop on Annotation, Recognition and Evaluation of Actions (AREA). Utrecht, Netherlands.

2020 Program committee, Meeting of the Asia-Pacific Chapter of the Association for Computational Linguistics and International Joint Conference on Natural Language Processing (ACL-ICJNLP). Virtual meeting (Hosted: Suzhou, China).

Program committee, Joint ACL-ISO Workshop on Interoperable Semantic Annotation (ISA).

Program committee, Language Grounding to Vision, Robotics and Beyond area, Conference on Empirical Methods in Natural Language Processing (EMNLP). Virtual meeting (Hosted: Punta Cana, Dominican Republic).

Program committee, Meeting of the Cognitive Science Society (CogSci). Virtual meeting (Hosted: Toronto, ON, Canada).

Program committee, Language Grounding to Vision, Robotics and Beyond area, Meeting of the Association for Computational Linguistics (ACL). Virtual meeting (Hosted: Seattle, WA, USA).

Program committee, AAAI Conference on Artificial Intelligence (AAAI). New York,

NY, USA.

Program committee, Student session, Web Summer School on Logic, Language, and Information (WeSSLLI). Virtual meeting (Hosted: Waltham, MA, USA).

Program committee, Special session on Gestures and Natural Language Semantics: Investigations at the Interface at *Sinn und Bedeutung* (SuB25-Gestures). London, England, UK.

2019 Program committee, Speech, Vision, Robotics, Multimodal and Grounding area (long and short papers), Conference on Empirical Methods in Natural Language Processing and International Joint Conference on Natural Language Processing (EMNLP-IJCNLP). Hong Kong.

Program committee, Vision, Robotics, Multimodal, Grounding and Speech area, Meeting of the Association for Computational Linguistics (ACL). Florence, Italy.

Program committee, Meeting of the Cognitive Science Society (CogSci). Montréal, QC, Canada.

Program committee, Semantics area (long papers), Meeting of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT). Minneapolis, MN, USA.

2018 Program committee, Workshop on Dialogue and Perception (DaP). Gothenburg, Sweden.

Pre-submission mentor, Student Research Workshop, Meeting of the North American Chapter of the Association for Computational Linguistics (NAACL). New Orleans, LA, USA.

Program committee, Workshop on Annotation, Recognition and Evaluation of Actions (AREA). Miyazaki, Japan.

Research Awards

2020- National Science Foundation Division of Information & Intelligent Systems: NSF2026:
2021 EAGER: A Playground and Proposal for Growing an AGI (consultant). Award #1033932. Funded \$12,000.

Honors & Awards

2019 Outstanding reviewer, Conference on Empirical Methods in Natural Language Processing and International Joint Conference on Natural Language Processing (EMNLP-IJCNLP).

Professional Membership

Association for Computational Linguistics (ACL), Association for the Advancement of Artificial Intelligence (AAAI), Linguistic Society of America (LSA), European Language Resource Association (ELRA).

Technical Skills

C#, Python, C++, C, Haskell, Unity, TensorFlow, Keras, *inter alia*.