## Jonathan Rawski Department of Linguistics & Language Development San Jose State University San Jose, CA

San Jose State University San Jose, CA

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Curriculum Vitae

<b>Employ</b>	ment	&	Affiliations
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2021-present San Jose State University

Assistant Professor, Department of Linguistics & Language Development

2023-2024 Massachusetts Institute of Technology

Visiting Faculty, Department of Linguistics & Philosophy (invited position)

2016-2021 Stony Brook University

Graduate Assistant, Computational Linguistics Lab

Graduate Assistant, Department of Neurobiology and Behavior Research Fellow, Institute for Advanced Computational Science

2015-2016 Higher School of Economics

Graduate Assistant, Theoretical Neuroscience Group & Neurolinguistics Laboratory

University of Minnesota 2012-2013

> Undergraduate Researcher, Department of Speech-Language-Hearing Sciences Student Manager & Research Assistant, NuMI Off-Axis Electron Neutrino Appearance (NOvA) Laboratory, Department of Physics

## Research Areas

Linguistics Phonology, Morphology, Learnability, Computational/Mathematical Linguistics

Computer Algorithmic Learning Theory, Automata Theory, Formal Languages, Finite Model

Science Theory, Machine learning

#### Education

2016–2021 PhD, Linguistics.

Stony Brook University

Dissertation: Structure and Learning in Natural Language

Advisor: Jeffrey Heinz

2014–2016 MSc, Cognitive Science.

Higher School of Economics

Thesis: Homeostasis in Harmonic Grammar

Advisors: Boris Gutkin (HSE/Ecole Normale) and Paul Smolensky (Johns Hopkins)

2010–2013 BA, Linguistics.

University of Minnesota - Twin Cities

#### Non Degree-Conferring

2019 LSA Linguistic Institute

2017 Crete Summer School of Linguistics

2016 Visiting Graduate Student, Neural Theory Group, École Normale Supérieure, Paris

2016 Winter Mathematics School, Higher School of Economics, Moscow Courses Taught Primary Instructor ESSLLI Expressivity of Transformers: Logic, Circuits, and Formal Languages - Sum24 (with David Chiang, Lena Strobl, Andy Yang) MIT Special Topics in Linguistics: Learnability and Linguistic Theory - S24 Topics in Computational Linguistics: Grammars & Representations - F23 San Jose Introduction to Linguistics - F21, S22, F22 Speech Technology - F21, F22 State Sound & Communication - S23, F24 Corpus Linguistics - S22 Natural Language Processing - S22, S23, F24 Stony Brook IACS Summer Youth Camp for Computational Linguistics - Sum20 Human Language - Sum17 Writing in Linguistics - W17, W18 Advanced English Academic Writing - S17 Teaching Assistant Stony Brook Computational Linguistics - S21 Language and Technology - F18, F20 Language Acquisition - S18 Human Language - F16 LSA Computational Phonology - Sum19 Institute CreteLing Introduction to Phonology - Sum17 Summer School Intro to Cognitive Science - F15, S16 Grants and Awards 2021 President's Award to Distinguished Doctoral Students, Stony Brook University 2018 – 2020 IACS Junior Researcher Fellowship 2017 Crete Summer School of Linguistics Fellowship (tuition, lodging) 2014 - 2016 Higher School of Economics Graduate Fellowship (tuition, lodging, stipend) 2014 - 2016 Russian Federation Graduate Scholarship 2012 - 2013 University of Minnesota UROP Grant (Co-PI with Peter Watson). "The Influence of Positive Correction on Phonological Learning" 2011 - 2013 North Central Electric League Scholarship 2010 - 2013 Tyer Hill Memorial Scholarship

2015, 2016 New York-St. Petersburg Institute for Linguistics, Cognition, and Culture (NYI)

## Publications and Manuscripts

- Note: author ordering is often alphabetical and/or prioritizes student authors Journal Articles
- in prep Rawski, Jonathan, Jeffrey Heinz, Logan Swanson. Abductive Inference of Phonotactic Constraints
- in prep Rawski, Jonathan. Computational Locality in Signed Phonology
- in revision Strobl, Lena, Dana Angluin, David Chiang, **Jonathan Rawski**, Ashish Sabharwal.

  Transformers as Transducers. Transactions of the Association for Computational Linguistics (TACL)
- in revision Dolatian, Hossep and **Jonathan Rawski**. Computational Locality in Nonlinear Morpho-phonology
  - in press Levenstein, Daniel, Aniello De Santo, Saskia Heijnen, Manjari Narayan, Freek J.W. Oude Maatman, **Jonathan Rawski**, Cory Wright. The problem-ladenness of theory. Computational Brain and Behavior
    - 2023 **Rawski, Jonathan** and Lucie Baumont. *Modern Language Models Refute Nothing*. Lingbuzz preprint
    - 2023 Rawski, Jonathan, Hossep Dolatian, Jeffrey Heinz and Eric Raimy. Regular and Polyregular Theories of Reduplication. Glossa
    - 2021 Lambert, Dakotah, **Jonathan Rawski**, and Jeffrey Heinz. *Typology Emerges from Simplicity in Representations and Learning*. Journal of Language Modeling.
    - 2021 Rawski, Jonathan, William Idsardi, and Jeffrey Heinz. Comment on "Nonadjacent Dependency Processing in Monkeys, Apes, and Humans". Science Advances
    - 2021 Aronoff, Mark, **Jonathan Rawski**, and Wendy Sandler. *Talk Isn't So Cheap*. Inference.
    - 2020 De Santo, Aniello and **Jonathan Rawski**. What Can Formal Language Theory Do for Animal Cognition Studies? Royal Society Open Science
    - 2019 **Rawski, Jonathan** and Jeffrey Heinz. No Free Lunch in Linguistics or Machine Learning: Reply to Pater. Language, 95(1)

#### Paper-reviewed Conference Proceedings

- 2024 Sun, Zhouyi and **Jonathan Rawski**. Tensor Product Representations of Regular Transductions. Proceedings of the Society for Computation in Linguistics, vol. 7
- 2022 Valvoda, Josef, Jonathan Rawski, Naomi Saphra, Ryan Cotterell, Adina Williams. Benchmarking Compositionality with Formal Languages. Proceedings of COLING 2022
- 2021 Dolatian, Hossep, Jeffrey Heinz, and **Jonathan Rawski**. Strong Generative Capacity of Morphological Processes. Proceedings of the Society for Computation in Linguistics, volume 4. Association for Computational Linguistics.
- 2020 Nelson, Max, H. Dolatian, J. Rawski, B. Prickett. Probing RNN Encoder-Decoder Generalization of Subregular Functions using Reduplication. Proceedings of the Society for Computation in Linguistics, volume 3. Association for Computational Linguistics

- 2020 Dolatian, Hossep and **Jonathan Rawski**. Multi-Input Strictly Local Functions for Templatic Morphology. Proceedings of the Society for Computation in Linguistics, volume 3. Association for Computational Linguistics
- 2020 Rawski, Jonathan and Hossep Dolatian. Multi-Input Strictly Local Functions for Tonal Phonology. Proceedings of the Society for Computation in Linguistics, volume 3. Association for Computational Linguistics
- 2019 Rawski, Jonathan. Tensor Product Representations of Subregular Formal Languages. Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI) workshop on Neural-Symbolic Learning and Reasoning
- 2019 Chandlee, Jane, R. Eyraud, J. Heinz, A. Jardine, **J. Rawski**. Learning with Partially Ordered Representations. In Proceedings of the 16th Meeting of on the Mathematics of Language (SIGMOL 2019), Association for Computational Linguistics (ACL).

## Abstract-reviewed Conference Proceedings

- 2024 Li, Amy and **Jonathan Rawski**. Regular Reduplication Across Modalities. Proceedings of the Society for Computation in Linguistics.
- 2021 Koser, Nate, Hossep Dolatian, **Jonathan Rawski**, and Kristina Strother-Garcia. *Computational Restrictions on Iterative Prosodic Processes*. Proceedings of the Annual Meeting on Phonology.
- 2019 Dolatian, Hossep, **Jonathan Rawski**. Finite-State Locality in Semitic Root-and-Pattern Morphology. Proceedings of the 43rd Penn Linguistics Conference
- 2019 Chandlee, Jane, R. Eyraud, J. Heinz, A. Jardine, **J. Rawski**. How the Structure of the Constraint Space Enables Learning. Proceedings of the Society for Computation in Linguistics. Association for Computational Linguistics
- 2018 De Santo, A., **J. Rawski**, and J.E. Drury. *Quantified Sentences as a Window Into Prediction and Priming: An ERP Study*. Proceedings of the 54th Meeting of the Chicago Linguistics Society
- 2018 Rawski, Jonathan. Subregular Complexity Across Speech and Sign. Proceedings of the Society for Computation in Linguistics
- 2017 Rawski, Jonathan. Phonological Complexity Across Speech and Sign. Proceedings of the 53rd Meeting of the Chicago Linguistics Society
  Peer-Reviewed Book Chapters
- in prep Heinz, Jeffrey, Jason Riggle, and **Jonathan Rawski**. Learnability. in Nasukawa, Samuels, Schwartz, Torkenczy (ed.), Wiley-Blackwell Companion to Phonology.
- to appear Rawski, Jonathan. Compound Reduction in Signed Phonology. in J. Heinz (ed.), Doing Computational Phonology.
- to appear Alena Aksenova, **Jonathan Rawski** Jeffrey Heinz, Thomas Graf. *The Computational Power of Harmony*. in Harry van der Hulst (ed.), The Oxford Handbook of Vowel Harmony.
  - 2022 Heinz, Jeffrey and **Jonathan Rawski**. *Learnability*. in B. Elan Dresher and Harry van der Hulst (eds.), The Oxford Handbook of the History of Phonology.

- 2022 De Santo, Aniello and **Jonathan Rawski**. *Mathematical Linguistics and Cognitive Complexity*. in Danesi, Marco (ed.), The Springer Handbook of Cognitive Mathematics.
- 2022 Bakovic, Eric, Jeffrey Heinz, and **Jonathan Rawski**. *Phonological abstraction in the mental lexicon*. in Lila R. Gleitman, Anna Papafragou (ed.), The Oxford Handbook of the Mental Lexicon.

## Presentations

#### Invited Lectures

- 2025, TBD TBD
  - Dagstuhl Institute Symposium on Theory of Neural Language Models
- 2024, Nov *TBD*Mathematics Seminar, CalTech
- 2024, Oct Mathematical Structures in Linguistics
  Mathematics & Statistics Colloquium, San Jose State University
- 2024, May Rethinking Poverty of the Stimulus
  Workshop on Theoretical Phonology, Concordia University
- 2024, May Transductive Linguistics Redux
  Computational Linguistics Lecture Series, CUNY
- 2024, Apr Mathematical Linguistics and Cognitive Complexity
  Linguistics Colloquium, Rutgers University
- 2024, Jan Abductive Inference of Phonotactic Constraints Atelier de Phonologie, CNRS
- 2024, Jan Learning (Sub)regular Transformations
  Automata Seminar, Institut de Recherche en Informatique Fondamentale, CNRS
- 2023, Nov Computational Properties of Language Linguistics Department, Harvard University
- 2023, Sep Rethinking Poverty of the Stimulus
  Cognitive Science Colloquium, University at Buffalo
- 2023, Sep Rethinking Poverty of the Stimulus

  Language and Cognition Colloquium, Harvard University
- 2023, May Learning Subregular Transformations

  Dagstuhl Instute Symposium on Regular Transformations
- 2023, May Rethinking Poverty of Stimulus
  Linguistics Colloquium, UC Irvine
- 2023, May Rethinking Poverty of Stimulus UCLA Psycholinguistics Seminar
- 2023, Apr Abductive Inference of Phonotactic Constraints Stanford P-Interest Seminar
- 2023, Jan Regular & Polyregular Functions and Transformers
  Formal Languages and Neural Networks (FLaNN) Seminar
- 2022, Oct Generative Capacity & the Linguistic Swampland Linguistics Colloquium, UC Davis

2022, Jun Generative Capacity & the Linguistic Swampland LINGUAE Seminar, Ecole Normale Superieure 2022, Jun Robustness in Sequential Pattern Learning Experiments Department d'Etudes Cognitives, Ecole Normale Superieure 2022, Apr Three Mathematical Lessons about Language Learning Guest Lecture, University of Utah 2022, Mar Language Emerges from Computability Computer Science Dept, San Jose State 2021, Sep Finite-State models and distributed computation in phonology Guest Lecture, UC Berkeley Linguistics Department 2021, Sep Abductive Learning of Phonotactic Constraints UC Berkeley Linguistics Phorum 2021, Sep Typology Emerges from Computability NLP Research Group, Monash University Typology Emerges from Computability 2021, Jun Association for Computational Linguistics Special Interest Group on Typology (SIGTYP) Lecture Series 2020, Feb Understanding Machine Learning with Language and Tensors What Do Formal Languages Tell Us About Cognition? Phonology and the Chomsky Hierarchy (2 Lectures) Concordia University, Montreal 2019, Nov Understanding Machine Learning with Language and Tensors. Dept. of Physics and Astronomy, Stony Brook University Subregular Morphology: Structures, Grammar, and Learning. 2019, May Computational Psycholinguistics Group, Waseda University, Tokyo, Japan 2019, May The Logical Nature of Phonology Across Speech and Sign. Linguistics Department, New York University 2019, Mar How the Structure of the Constraint Space Enables Learning. L'UFR Linguistique, Université Paris 7 Diderot 2018, Nov Learning with Partially Ordered Representations. IACS Seminar Series, Stony Brook University 2018, Oct The Computational Nature of Phonology Across Speech and Sign. How the Structure of the Constraint Space Enables Learning. Linguistics Department, University of Connecticut 2018, Mar The Logical Complexity of Phonology Across Speech and Sign. Institut Jean Nicod, Ecole Normale Superieure 2016, Nov Homeostatic Reinforcement Learning for Harmonic Grammars. Linguistics Department, Massachusetts Institute of Technology 2016, April Homeostasis in Harmonic Grammar

Laboratoire de Neurosciences Cognitives, Ecole Normale Superieure

2013, April Neuroplasticity and Second-Language Learning Linguistics Colloquium, University of Minnesota

## Conference and Workshop Talks

- 2024, Jun Li, Amy and **Jonathan Rawski**. Regular Reduplication Across Modalities. Society for Computation in Linguistics.
- 2022, Oct Rawski, Jonathan and Jeffrey Heinz. BUFIA: Phonotactic Learning with Non-statistical Abductive Inference. Tutorial given at Annual Meeting on Phonology
- 2022, Sep Rawski, Jonathan and Lucie Baumont. *Phonology and the Linguistic Swampland*. Stony Brook Workshop on Model Theoretic Representations in Phonology
- 2021, Jan Dolatian, Hossep, Jeffrey Heinz, and **Jonathan Rawski**. Strong Generative Capacity of Morphological Processes. Society for Computation in Linguistics
- 2020, Sep Rawski, Jonathan and Jeffrey Heinz. What Does "Simplicity" Mean in Grammar Learning?. Northeast Computational Phonology Circle.
- 2020, Jan Nelson, Max, H. Dolatian, **J. Rawski**, B. Prickett. *Probing RNN Encoder-Decoder Generalization of Subregular Functions Using Reduplication*. Society for Computation in Linguistics
- 2020, Jan Dolatian, Hossep and **Jonathan Rawski**. Multi-Input Strictly Local Functions for Templatic Morphology. Society for Computation in Linguistics
- 2019, Nov Rawski, Jonathan. Tensor Product Representations of Subregular Constraints. Northeast Computational Phonology Circle, Rutgers University.
- 2019, Aug Rawski, Jonathan. Tensor Product Representations of Subregular Formal Languages. 14th Neural-Symbolic Learning and Reasoning Workshop at the International Joint Conference on Artificial Intelligence (IJCAI), Macau.
- 2019, July Rawski, Jonathan, Aniello de Santo, Thomas Graf, Jeffrey Heinz. Geometric Representations of Linguistic Structures and Computations. Annual Meeting of the Society for Mathematical Psychology, Montréal, Canada.
- 2019, July Jane Chandlee, Remí Eyraud, Jeffrey Heinz, Adam Jardine, **Jonathan Rawski**. Learning with Partially Ordered Representations. 16th Meeting on the Mathematics of language (SIGMOL 2019). Toronto.
- 2019, June Jane Chandlee, Remí Eyraud, Jeffrey Heinz, Adam Jardine, **Jonathan Rawski**. Learning with Partially Ordered Representations. University of Reykjavik, Iceland. Workshop on Learning and Automata (LearnAut) at the ACM/IEEE Symposium on Logic in Computer Science (LICS 2019).
- 2019, May Rawski, Jonathan. Grammars, Structures, and Learning with Sparse Data. Stony Brook-Tokyo Institute of Technology Joint Meeting. Tokyo.
- 2019, May Jane Chandlee and **Jonathan Rawski**. Learning with Locality Across Speech and Sign. Workshop on Rules and Learning Strategies Across Spoken and Signed Language at the 43rd Generative Linguistics in the Old World Conference. Oslo.
- 2019, May Dolatian, Hossep and **Jonathan Rawski**. The Computational Nature of Templatic Morphology. 4th American International Morphology Meeting. New York.
- 2019, Apr Dolatian, Hossep and **Jonathan Rawski**. The Computational Nature of Templatic Morphology. Phonology in the NorthEast. Yale University
- 2019, Apr Dolatian, Hossep, **Jonathan Rawski**, Sedigheh Moradi. Computational Implementation of Semitic Template Matching. Annual Symposium on Arabic Linguistics. Toronto.

- 2019, Mar Dolatian, Hossep, **Jonathan Rawski**, Sedigheh Moradi. *The Computational Nature of Templatic Morphology*. 43rd Penn Linguistics Conference. UPenn, Philadelphia.
- 2018, Nov Rawski, Jonathan, Jane Chandlee, Remí Eyraud, Jeffrey Heinz, Adam Jardine. How the Constraint Space Structure Enables Learning. NorthEast Computational Phonology Circle. MIT, Boston.
- 2018, July Graf, Thomas, A. Aksenova, A. de Santo, H. Dolatian, **J. Rawski**, S. Yang, J. Heinz. *Tiers and Relativized Locality Across Language Modules*. Parallels Between Phonology and Syntax Workshop. Meertens Institut, Amsterdam.
- 2018, May Rawski, Jonathan, Jeffrey Heinz, Adam Jardine, Jane Chandlee. *How the Constraint Space Structure Facilitates Learning*. 10th North American Phonology Conference. Concordia University, Montreal.
- 2018, Apr De Santo, A., **J. Rawski**, and J.E. Drury. *Quantified Sentences as a Window into Prediction and Priming: An ERP Study*. Talk. The 54th Annual Meeting of the Chicago Linguistic Society. University of Chicago.
- 2018, Mar Rawski, Jonathan. Pirates & Publishers. Conference on The Social Responsibility of Intellectuals, New School for Social Research
- 2017, May Rawski, Jonathan. Phonological Complexity is Subregular: Evidence from Sign Language. Talk. The 53rd Annual Meeting of the Chicago Linguistic Society. University of Chicago.
- 2016, Dec Rawski, Jonathan. Homeostatic Reinforcement Learning for Harmonic Grammars. Talk. SYNC Conference, CUNY
- 2013, April Rawski, Jonathan. Neuroplasticity in Second Language Learning. Talk. Minnesota Undergraduate Linguistics Symposium, St. Olaf University

  Conference Posters
- 2024, Nov Swanson, Logan, **Jonathan Rawski**, and Jeffrey Heinz. *Phonotactic Learning and Constraint Selection without Statistics*. Annual Meeting on Phonology, Rutgers University.
- 2024, Jun Sun, Zhouyi and **Jonathan Rawski**. Tensor Product Representations of Regular Transductions. Society for Computation in Linguistics.
- 2020, Sep Koser, Nate, Hossep Dolatian, **Jonathan Rawski**, and Kristina Strother-Garcia. *Computational Restrictions on Iterative Prosodic Processes*. Annual Meeting on Phonology, UC Santa Cruz.
- 2020, Jan Rawski, Jonathan and Hossep Dolatian. *Multi-Input Strictly Local Functions* for Tonal Phonology. Proceedings of the Society for Computation in Linguistics, volume 3.
- 2019, Oct Dolatian, Hossep and **Jonathan Rawski**. Computing Tone: Input Strict Locality over Multiple Inputs. Annual Meeting on Phonology, Stony Brook University.
- 2019, Jan Rawski, Jonathan, Jeffrey Heinz, Adam Jardine, Jane Chandlee. How the Structure of the Constraint Space Enables Learning. Poster. Society for Computation in Linguistics Meeting, New York City
- 2018, May Rawski, Jonathan, Jeffrey Heinz, Adam Jardine, Jane Chandlee. Learning Within Linguistically Structured Constraint Spaces. Joint Science Meeting, Stony Brook University.

- 2018, Jan Rawski, Jonathan. Subregular Complexity Across Speech and Sign. Poster. Society for Computation in Linguistics Meeting, Salt Lake City
- 2017, Nov De Santo, A., **J. Rawski**, and J.E. Drury. *ERP effects for quantifier complexity, priming, and truth-value in an auditory/visual verification task.* Society for the Neurobiology of Language Annual Meeting, Baltimore.
- 2017, Sept Rawski, Jonathan, A. de Santo, and J. Heinz. Reconciling Minimum Description Length with Grammar-Independent Complexity Measures. Poster. MIT Workshop on Simplicity in Grammar Learning
- 2015, June Rawski, Jonathan. A Homeostatic Space for Optimality Theoretic Grammars. Poster. Pronouns: Syntax, Semantics, Processing Conference, Moscow
- 2013, Aug Rawski, Jonathan. The Influence of Feedback On L2 Phonology Learning. Poster. UROP Summer Symposium, University of Minnesota

# Leadership, Service, and Affiliations Journal Reviews

- 2024 Morphology
- 2023 NLLT
- 2022 Phonology, Computational Linguistics, TACL
- 2021 Biology
- 2020 Journal of Linguistics, Journal of Language Modeling
- 2019 Phil. Trans. Royal Society B: Biological Sciences
- 2018 Language

#### Conference and Grant service

- 2023,2024 Reviewer, NSF Proposals
  - 2024 Organizer, LSA Special Session on "Formal Language Theory in Phonology and Morphology
  - 2023 Program Committee, Association for Computational Linguistics (ACL)
  - 2023 Program Committee, International Conference on Grammatical Inference (ICGI)
  - 2022 Area Chair, International Conference on Computational Linguistics (COLING)
- 2022,2023 Program Committee, ACL Special Interest Group on Computational Morphology and Phonology (SIGMORPHON)
- 2020-2022 Program Committee, Conference on Natural Language Learning (CoNLL)
  - 2020 Reviewer, Cognitive Science Society Annual Meeting

## Department/University

#### SJSU

- 2024-present Director/Coordinator, MSc program in Computational Linguistics
- 2024-present President's Advisory Committee on AI
  - 2022-2023 College Curriculum Committee
  - 2022-2023 LLD Student Association faculty advisor
- 2021-present LLD Department Curriculum Committee
- 2021-present LLD Department Student Advisor

2021-2023	Lead, Planning Committee for new MSc program "Computational Linguistics"
2021-2023	Planning Committee for new BSc program "Computer Science & Linguistics"
2021-2022	Department Hiring Committee
	Stony Brook
2018-2020	Student President, Institute for Advanced Computational Science
2018	Organizer, Stony Brook-Yale-NYU-CUNY (SYNC) Conference
2017 - 2018	Organizer, Mathematical Linguistics Reading Group
2017	Organizer, Northeast Computational Phonology Workshop
2017	Organizer, Linguistics Colloquium Series
	Students Supervised
Lena Strobl	Visiting PhD Student at MIT, Spring 2024
Andre Domingo	SJSU undergrad project "Learning Polyregular Functions with Transformers"
Alexey Genzel	High School project "Language Ideology and Criticism in the Constructed Language Community" (accepted as poster at LSA 2023)
	Community Service
2017-2021	Volunteer, Community Solidarity Association Long Island Organized food redistribution from local groceries to local homeless shelters and people in need
	Professional Memberships
2019-Present	Society for Mathematical Psychology
2017-Present	Linguistic Society of America
2017-2021	Society for the Neurobiology of Language