

John A. Rieffel

CONTACT INFORMATION	Computer Science Department Union College Steinmetz Hall 227 807 Union St. Schenectady, NY 12308 USA	<i>Voice:</i> (518) 388-6062 <i>Fax:</i> (518) 388-6789 <i>E-mail:</i> rieffelj@union.edu <i>WWW:</i> www.cs.union.edu/~rieffelj
EDUCATION	Brandeis University , Waltham, Massachusetts <ul style="list-style-type: none">• Ph.D., Computer Science, May 2006• M.A., Computer Science, May 2004 Dissertation Topic: <i>Evolutionary Fabrication: The Co-Evolution of Form and Formation</i> Advisor: Jordan Pollack, DEMO Lab Swarthmore College , Swarthmore, Pennsylvania <ul style="list-style-type: none">• B.S., Engineering, May 1999• B.A., Computer Science, May 1999 Ringling Brothers and Barnum and Bailey Clown College , Baraboo, Wisconsin <ul style="list-style-type: none">• B.F.A. (Bachelor of Funny Arts), October 1994	2001 - 2006 1995 - 1999 1994
TEACHING EXPERIENCE	Union College , Schenectady, NY <ul style="list-style-type: none">• <i>Associate Professor</i>, Computer Science Department• <i>Assistant Professor</i>, Computer Science Department CSC 104: Robots Rule! CSC 105: Game Development: Intro to CS CSC 106: Can Computers Think? CSC 108: Scientific Computing CSC 109: Matlab Programming for Engineers CSC 234: Data Visualization CSC 235: Modeling and Simulation CSC 245: The Computer Science of Computer Games CSC 270: Computer Organization CSC 320: Artificial Intelligence CSC 325: Robotics CSC 333: Parallel Programming CSC 483: Advanced Topics in Computer Architecture CSC 483: Advanced Topics in Computer Vision CSC 497: Junior Capstone Design Seminar CSC 490: Independent Study Tensegrity Robotics (Enrollment: 1) Artificial Intelligence (Enrollment: 2) SRS 200: Privacy, Trust, and Identity Senior Projects Supervised: Kyle Doney: <i>Tensegrity Robot Locomotion</i> David Metraux: <i>Skate Embryogenesis Modeling</i> Sahar Shakeel: <i>Using Fourier-Based Descriptors for Design Discovery-Based Interfaces</i> Nelson Trombley: <i>A Simulator Neural Network for Predicting Pendulum Motion</i> Jonathan Kimber: <i>Testing the effectiveness of different search policies in finding movement gaits for a wireless vibrational tensegrity</i> Zongliang Ji: <i>Exploring the Behavior Repertoire of a Wireless Vibrationally Actuated</i>	since September, 2015 September, 2009 - August, 2015 [S10,S11,S14,S15,S17,S18] [F14] [F18,W20] [F20] [F13,F11, F10, S10] [S20] [S19] [F13] [W10 – W19] [F11,F10,W20] [S11,F14] [S14,S12,S17,F18,S21] [S15] [F19] [S12,S17-S20] [S12] [F10] [F16,F17] 2020 2020 2020 2020 2019

<i>Tensegrity Robot</i>	2019
Matthew Egglin: <i>Phishing Prevention through Filtering and Education</i>	2019
Akshay Kashyap: <i>Transfer Learning for Faster Discovery of Tensegrity Robot Gaits</i>	2018
Elizabeth Ricci: <i>A Better Way to Construct Tensegrities: Planar Embeddings Inform Tensegrity Assembly</i>	2018
Frank Chiarulli: <i>Controlling 3D Printers with Artificial Neural Networks</i>	2017
John Peterson: <i>Effective ANN Topologies for use as Genotypes for Evolutionary Design and Invention</i>	2017
Andrew Hilton: <i>Evolving Skate Guts</i>	2017
Jessica Sanford: <i>Detection and Deflection of Digital Cameras</i>	2016
Kathryn Tomaselli: <i>Designing an Autonomous Robot to Calculate Pose While Navigating a Tennis Court</i>	2016
Sarah Nadler: <i>Revamping CS1 Through Robotics</i>	2016
Jack Stow: <i>Determining Location Through Smartphone Inertial Positioning</i>	2016
Alvin Andino: <i>Evolving Behaviorally Diverse Soft Robots</i>	2015
Ben Berger: <i>Evolving Scalable Soft Robots</i>	2015
Julian Jocque: <i>Opponent Modeling in Board Games Using the Estimation Exploration Algorithm</i>	2015
Andrew Danise: <i>Evolving Soft Robots with Vibration Based Movement</i>	2014
Steven Stangle: <i>Designing a Wireless Tensegrity Robot</i>	2014
Timothy Kuehn: <i>Evolutionary Fabrication</i>	2012
Ben Humphreys: <i>Evolutionary Locomotion</i>	2012
Davis Knox: <i>Scalable Co-Evolution of Soft Robot Properties and Gaits</i>	2011
Ben Lynch: <i>Crowd Control: Harnessing the Wisdom of the Crowd to Trade</i>	2011
Paul Tunison: <i>Evolution of Flow in Games</i>	2011
Dave Sayles: <i>EvoFabber: Evolutionary Fabrication</i>	2010

Tufts University, Medford, MA

- *Instructor*, CompSci150: Stochastic Search and Evolutionary Computation. **Spring 2009**
Created and taught in collaboration with Professor Soha Hassoun.
- *Undergraduate and graduate mentorship and research collaboration. (see publications)*

Cornell University, Ithaca, NY

- *Guest Lecturer* MAE750/CS650: Evolutionary Computation. **November 2008**
- *Graduate Teaching Development Workshop* **Fall 2007**
Attended workshop on curriculum development and teaching methods.
- *Undergraduate and graduate mentorship and research collaboration (see publications)*

Brandeis University, Waltham, Massachusetts

- *Head Teaching Assistant*
CS35a: Artificial Intelligence **Spring 2006**
CS120a: Performance Analysis of Storage Systems **Fall 2005**
CS21B: Structure and Interpretation of Computer Programs. **Spring 2002 - 2005**
Additional responsibilities included leading a weekly recitation.

Swarthmore College, Swarthmore, Pennsylvania

- *Teaching and Laboratory Assistant* **1997 - 1999**
• E58: Control Theory • CS63: Artificial Intelligence • E21: Digital Logic Design
• E72: Electronic Circuit Applications

RESEARCH AND
PROFESSIONAL
EXPERIENCE

Visiting Researcher, University of Lorraine **May-June 2016**
LARSEN/Resibots Team: integrated tensegrity robots with the LIMBO algorithm in order to produce robust locomotion.

Postdoctoral Associate, Tufts University **February 2008 - July 2009**
Biomimetic Devices Laboratory: Desinging caterpillar-inspired soft robots.

Postdoctoral Associate, Cornell University **June 2006 - December 2007**
Cornell Computational Synthesis Laboratory: Research focused on modeling and controlling tensegrity-based robots.

Biology Department, Brandeis University, Waltham, MA **2002 - 2006**
Software and Systems Consultant. Lead Developer for LifeSongX, behavioral and acoustical analysis software, used primarily to study *drosophila* courtship.

Bluefin Robotics, Cambridge, MA. **2001**
Software Engineer. Developed and refined key components and device drivers for their QNX-based real-time software for Autonomous Underwater Vehicle (AUV) control.

Autonomous Underwater Vehicles (AUV) Lab, MIT, Cambridge, MA **1999-2001**
Research Engineer. Assisted in developing, building and piloting the lab's new class of robotic submersibles. Over 15 weeks of at-sea deployment.

GRANTS AND
AWARDS

(2019) **Rieffel, J.**, EAGER: Behavioral Repertoires for Soft Robotics (NSF Award ID NRI-1939930) \$49,952

(2018) **Rieffel, J.**, Webb, N., Currey, J., Fleishman, L., Kirkton, S. , MRI: Acquisition of a High Resolution High Speed 3D Motion Tracking System for Multi-Disciplinary Research and Research Training, (NSF Award ID DBI-1827495) \$272,430

(2015) Kirkton, S., **Rieffel, J.**, Fleishman, L., Olberg, R., and Currey, J. "MRI: Acquisition of a High-Resolution Micro-Computed Tomography System for Multidisciplinary STEM Research and Undergraduate Training" (NSF Award ID DBI-1531850) \$379,130

(2014) Burkett, A., **Rieffel, J.** "The Architecture of Literature: 3D Printing and the Genre of English Manor House Writing", Union College Internal Education Fund. \$700

(2013) **Rieffel, J.**, Anderson, A., Rice, S. "MRI: Acquisition of a Multi-Material 3D Printer to Enable Novel Multi-disciplinary Research and Research Training" (NSF Award ID CMMI-1337768) \$333,531

(2013) **Rieffel, J.**, "BerryPatch: a low-cost, low-power, supercomputing cluster for teaching and training", Union College Internal Education Fund. \$2390

(2013) **Rieffel, J.**, "Tensegrity Robotics", Union College Faculty Research Grant. \$1000

(2012) **Rieffel, J.**, "Fostering Union Bicycle Commuting: Bicycle Rack Improvements", President's Green Grant. \$2000.

(2011) **Rieffel, J.**, "Fostering Union Bicycle Commuting: Bicycle Commuting Incentive Program", President's Green Grant. \$500

(2010) **Rieffel, J.**, "Fostering Union Bicycle Commuting: Locker Room Renovations in S+E", President's Green Grant. \$2000

REFEREED
JOURNAL PAPERS
(* indicates
undergraduate
co-author)

Rieffel, J. and Mouret, J. “Adaptive and Resilient Soft Tensegrity Robots”. *Soft Robotics* 5.3 (2018): 318-329.

Rieffel, J., Knox, D.*, Smith, S.* and Trimmer, B (2014) “Growing and Evolving Soft Robots”, *Artificial Life* 20, no. 1 (2014): 143-162.

Rieffel, J., Valero-Cuevas, F. and Lipson, H. (2010) “Morphological Communication: Exploiting Coupled Dynamics in a Complex Mechanical Structure to Achieve Locomotion”. *J. R. Soc. Interface* April 6, 2010 7:613-621

Rieffel, J., Valero-Cuevas, F. and Lipson, H. (2009) “Automated Discovery and Optimization of Large Irregular Tensegrity Structures”. *Computers and Structures* 87 (2009) 368-379

REFEREED
CONFERENCE
AND WORKSHOP
PAPERS

Doney, K.*, Petridou, A.*, Karaul, J.*, Khan, A.*, Liu, Geoffrey*, and **Rieffel, J.** (2020) ”Behavioral Repertoires for Soft Tensegrity Robots”, (to appear) In 2020 IEEE Symposium Series on Computational Intelligence (SSCI) (SSCI 2020) (arXiv preprint: arXiv:2009.10864)

Kimber, J.*, Ji, Z.*, Petridou, A.*, Sipple, T.*, Barhydt, K.*, Boggs, J.*, Dosiek, L. and **Rieffel, J.** (2019) ”Low-Cost Wireless Modular Soft Tensegrity Robots”. In 2019 2nd IEEE International Conference on Soft Robotics (RoboSoft) (pp. 88-93). IEEE.

Konsella, R.*, Chiarulli*, F., Peterson*, and **John Rieffel.** (2017) “A baseline-realistic objective open-ended kinematics simulator for evolutionary robotics.” In *Proceedings of the Genetic and Evolutionary Computation Conference Companion*, pp. 1113-1116. ACM.

Berger, B.*, Andino, A.*, Danise, A.*, and **Rieffel, J.** (2015) ”Growing and Evolving Vibrationally Actuated Soft Robots”, Student Workshop at the 2015 Genetic and Evolutionary Computation Conference (GECCO). ACM.

Khazanov, M.*, Jocque, J.*, and **Rieffel, J.** (2014) “Developing Morphological Computation in Tensegrity Robots for Controllable Actuation”, Student Workshop at the 2014 Genetic and Evolutionary Computation Conference (GECCO). ACM.

Khazanov, M.*, Jocque, J.*, and **Rieffel, J.** (2014) “Evolution of Locomotion on a Physical Tensegrity Robot”, *Proceedings of the 14th International Conference on the Synthesis and Simulation of Living Systems (ALIFE13)*. MIT Press.

Khazanov, M.*, Humphreys, B.*, Keat, W., and **Rieffel, J.** (2013) ”Exploiting dynamical complexity in a physical tensegrity robot to achieve locomotion.” *Advances in Artificial Life, ECAL*. Vol. 12. 2013.

Rieffel, J. (2013) ”Heterochronic scaling of developmental durations in evolved soft robots.” *Proceedings of the 2013 Genetic and Evolutionary Computation Conference (GECCO)*. ACM.

Rieffel, J. and Smith, S.* (2012), “Growing and Evolving Soft Robots with a Face-Encoding Tetrahedral Grammar (poster)”, *Proceedings of the 2012 Genetic and Evolutionary Computation Conference (GECCO)*. ACM.

Kuehn, T.* and **Rieffel, J.** (2012) “Automatically Designing and Printing Objects with EvoFab 0.2”, *Proceedings of the 13th International Conference on the Synthesis and Simulation of Living Systems (ALife XIII)*, pp. 372-378

- Knox, D.* and **Rieffel, J.**, (2011) "Scalable Co-Evolution of Soft Robot Properties and Gaits". Proceedings of the Eleventh European Conference on the Synthesis and Simulation of Living Systems (ECAL). MIT Press. 416-422.
- Sayles, D.* and **Rieffel, J.**, (2010) "EvoFab: A Fully Embodied Evolutionary Fabricator". (2010) Proceedings of the 9th International Conference on Evolvable Hardware. Springer.
- Rieffel, J.** and Trimmer, S., "Body/Brain Co-Evolution in Soft Robots" (Extended Abstract) Proceedings of the 12th International Conference on the Synthesis and Simulation of Living Systems (ALIFE12). MIT Press. 257-260.
- Smith, S.* , and **Rieffel, J.** (2010) "A Face-Encoding Grammar for the Generation of Tetrahedral-Mesh Soft Bodies". Proceedings of the 12th International Conference on the Synthesis and Simulation of Living Systems (ALIFE12). MIT Press. 414-420.
- Saunders, F., **Rieffel, J.** and Rife, J. (2009) "A Method of Accelerating Convergence for Genetic Algorithms Evolving Morphological and Control Parameters for a Biomimetic Robot", International Conference on Autonomous Robots and Agents.
- Rieffel, J.**, Saunders, F., Nadimpalli, S., Zhou, H., Hassoun, S., Rife, J. and Trimmer, B. (2009) "Evolving Soft Robotic Locomotion in PhysX", Proceedings of the 2009 Genetic and Evolutionary Computation Conference.
- Rieffel, J.**, Trimmer, B. and Lipson, H. (2008) "Mechanism as mind: what tensegrities and caterpillars can teach us about soft robotics." Artificial Life XI: Proceedings of the Eleventh International Conference on the Simulation and Synthesis of Living Systems.
- Rieffel, J.**, Valero-Cuevas, F. and Lipson, H. (2007) "Growing form-filling tensegrity structures using map L-systems". Proceedings of the 2007 Genetic and Evolutionary Computation Conference.
- Rieffel, J.**, Stuk, R. and Lipson, H. (2007) "Locomotion of a Tensegrity Robot Via Dynamically Coupled Modules". Proceedings of the 2007 International Conference on Morphological Computation.
- Rieffel, J.** and Pollack, J. (2006) "An Endosymbiotic Model for Modular Acquisition in Stochastic Developmental Systems". Proceedings of the Tenth International Conference on the Simulation and Synthesis of Living Systems (ALIFE X).
- Rieffel, J.** and Pollack, J. (2005) "Crossing the Fabrication Gap: Evolving Assembly Plans to Build 3-D Objects". 2005 IEEE Congress on Evolutionary Computation.
- Rieffel, J.** and Pollack, J. (2005) "Automated Assembly as Situated Development: Using Artificial Ontogenies to Evolve Buildable 3-D Objects". Proceedings of the 2005 Genetic and Evolutionary Computation Conference.
- Rieffel, J.** and Pollack, J. (2005). "Evolutionary Fabrication: The Emergence of Novel Assembly Methods in Artificial Ontogenies". SEEDS workshop, at the 2005 Genetic and Evolutionary Computation Conference.
- Rieffel, J.** and Pollack, J. (2005) "Evolving Assembly Plans for Fully Automated Design and Assembly." Proceedings of the 2005 NASA/DoD Conference on Evolvable Hardware.

Rieffel, J. and Pollack, J. (2004) “Artificial Ontogenies for Real World Design and Assembly.” Ninth International Conference on the Simulation and Synthesis of Living Systems (ALIFE9) Workshop: Self-Organization and Development in Artificial and Natural Systems (SODANS) 2004.

Rieffel, J. and Pollack, J. (2004) “The Emergence of Ontogenic Scaffolding in a Stochastic Development Environment”. Proceedings of the 2004 Genetic and Evolutionary Computation Conference.

Rieffel, J., DiLeo, C., and Maxwell, B.A. (1999) “Evolving Optimal Histogram Parameters for Object Recognition”, Proceedings, SPIE Intelligent Robots and Computer Vision XVIII.

EDITED VOLUMES **Rieffel, J.,** Mouret, J.B., Bredeche, N., and Haasdijk, E. (Eds.) (2017) “Evolution of Physical Systems Special Issue” *Artificial Life* (2017) 23:2, 119-123

Hiroki Sayama, **John Rieffel,** Sebastian Risi, Ren Doursat and Hod Lipson (Eds.) (2013) Proceedings of the Fourteenth International Conference on the Synthesis and Simulation of Living Systems. MIT Press.

OTHER PUBLICATIONS **Rieffel, J.,** Mouret, J.B., Bredeche, N., and Haasdijk, E. “Introduction to the Evolution of Physical Systems Special Issue” *Artificial Life* (2017) 23:2, 119-123

Rieffel, J. (2011) “Book Review: Trent McConaghy, P. Palmers, G. Peng, Michiel Steyaert, Georges Gielen: Variation-aware analog structural synthesis: a computational intelligence approach”, Genetic Programming and Evolvable Machines: Volume 12, Issue 4 (2011), Page 461-462

COLLEGE SERVICE

- Chair, Faculty Review Board **2017-18**
- Division IV Representative to the Faculty Review Board **2016-19**
- Co-Director, Mellon Presidential Global Learning Trip to Berlin **2017**
- Faculty Review Board Subcommittee to Review the Merit System **2016**
- Division IV Representative to the Committee on Undergraduate Research **2014-16**
- Steering Committee, Mellon Our Shared Humanities (MOSH) Grant **2015-**
 - Chair, MOSH Maker Subcommittee **2016**
- Co-Chair, FRB Subcommittee to Review the Merit System **2016**
- Co-Chair, Div IV Representative to the Center 2 Space Committee (C2SPC) **2014-2016**
- Member, USustain Bicycle Advisory Committee **2014-2015**
- Division IV Representative to the Academic Affairs Council (AAC) **2011-2014**
- Representative to the Intellectual Enrichment Grant Committee **2010-2012**
- Organizer, fOzone Cafe (Faculty-and-Staff-served Ozone Cafe) **2010-2015**

PROFESSIONAL ACTIVITIES **Ph.D. Committees**

- Ph.D. Examiner, Davide Zappetti, Ecole Polytechnique Federale de Lausanne, Switzerland **2021**
- Ph.D. Examiner, Christiaan Pretorius, Nelson Mandela University, South Africa **2019**
- Ph.D. Examiner, Frank Saunders, Tufts University, USA **2012**

Professional Service

- External Tenure Reviewer, Smith College **2020**
- Swarthmore College Engineering Advisory Council **2018-**
- External Reviewer, South African National Research Foundation **2020**
- External Ph.D. Examiner, C.J. Pretorius, Nelson Mandela University, South Africa **2019**
- Assessment Committee for Assistant Professorship in Robotics , IT Copenhagen **2017**
- Colby College Overseers Visiting Committee to the Computer Science Department **2015**

Professional Organizations

- *Board of Directors*, International Society for Artificial Life (ISAL). 2013-18

Conferences and Workshops

- *Panelist*, 2021 International Workshop on Embodied Intelligence (2021)
- *Chair*, Workshops and Tutorials Committee, IEEE Robosoft (2021)
- *Chair*, Tensegrity Robotics Workshops, IEEE RoboSoft (2018), ICRA (2019)
- *Chair*, Workshops and Tutorials, 14th International Conference on the Simulation and Synthesis of Living Systems. (ALIFE14) (2014)
- *Chair*, Workshop on the Evolution of Physical Systems ALIFE(2012,2014), ECAL (2013,2015)
- *Chair*, Undergraduate Research Workshop, GECCO (2012)
- *Chair*, Session on Soft and Amorphous Robotics, ALife XI (2008)
- *Program Committee*: GECCO (2007,2008,2009,2010,2011,2012,2013), ALIFE (2008,2010,2012,2014), ECAL (2011,2013)
- *Invited Participant*, Developmental Systems Workshop, AAAI Fall Symposium 2006.

Invited Talks

- *2020 NSF NRI PI Meeting*, Behavioral Repertoires for Soft Tensegrity Robotics, March 2021.
- *2020 NSF NRI PI Meeting*, Behavioral Repertoires for Soft Tensegrity Robotics, February 2020.
- *Vassar College*, Exploring Tensegrity Workshop, August 2019.
- *Yale University*, Mechanical Engineering Seminar, July 2018.
- *Tufts University*, Computer Science Department, April 2018.
- *Vassar College*, Computer Science Department Seminar, February 2015.
- *Smith College*, Computer Science Department Colloquium, April 2014.
- *Williams College*, Computer Science Department Colloquium, November 2012.
- *Union College Minerva Course*, Guest Lectures on “Logic, Rationality and Life”, April 2012, May 2012.
- *Binghamton University*, EVOS Seminar Speaker, February 2012.
- *University of Vermont*, Computer Science Seminar Speaker, March 2010.
- *Sarah Lawrence College*, Computer Science Speaker Series, November 2009.
- *Union College Biology Department*, Department Seminar September, 2009.
- *Swarthmore College Computer Science Department*, Department Seminar, 2009.
- *Icosystem Inc.*, Science Friday Guest Speaker Series. June, 2008 .
- *Tufts University*, Biology Department Spring Seminar Series. March, 2008.
- *Cornell University*, Machines and Organisms Seminar Series. September, 2006.

Reviewer

- *Editorial Board*: Frontiers in Evolutionary Robotics
- *Journals*: Journal of Advanced Robotics • Acta Mechanica • Artificial Life • IEEE Transactions on Evolutionary Computation. • Soft Robotics • Nature Machine Intelligence • PLOS One • Bioninspiration and Biomimetics
- *Conferences*: GECCO • ECAL • ALIFE • Robotics and Autonomous Systems • IEEE SSCI
- *Grants and Foundations*: NSF • NASA • Volkswagen Foundation

PRESS AND MEDIA

- *Swarthmore College Bulletin*. ”Infinite Jest”. Fall 2016 Issue.
- *US News and World Report*. “How 3-D printing Will Revolutionize Prosthetics”. Published 6/16/2014.
- *WNYT News Channel 13* “Using 3-D printers to change lives”. Aired 6/13/2014.
- *Union College Concordiensis* “Union Students begin 3D printing”. Published 2/6/2014.
- *Union College Alumni Magazine* “focUs: Mechanisms as Minds”. Fall 2013 issue.