

# Dr. Viktor Zykov, BEng, MEng, MSc, PhD

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Research Scientist  
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My professional interests span several areas of science and technology, including renewable kite wind energy extraction, modular self-reconfigurable robotics, evolutionary system optimization, under-informed structural system identification, stochastic robot self-repair, self-reconfiguration, and self-reproduction, and controls engineering. I strive to apply my results-focused approach, teamwork ability, and creativity to effectively realize innovative technologies in a formal and competitive research and development environment.

## EDUCATION

- |            |   |                                     |
|------------|---|-------------------------------------|
| 01-05/2008 | <b>Postdoctoral Associate</b><br>Computational Synthesis Laboratory, Sibley School of Mechanical and Aerospace Engineering,<br>Cornell University, Ithaca, NY, USA. <i>Advisor:</i> <a href="#">Prof. Dr. Hod Lipson</a>  | <b>CCSL, Cornell</b>                |
| 2003-2007  | <b>Doctor of Philosophy, Master of Science</b><br><i>Major Field:</i> Mechanical Engineering<br><i>PhD Thesis:</i> Morphological and Behavioral Resilience against Physical Damage for Robotic<br>Systems. <i>Advisor:</i> <a href="#">Prof. Dr. Hod Lipson</a>   | <b>CCSL, Cornell</b>                |
| 2000-2002  | <b>Master of Engineering &amp; Technology</b><br>Ivanovo State Power Engineering University, Ivanovo, Russia<br><i>Major Field:</i> Electrical Engineering, Electromechanics, Electrotechnology<br><i>Concentration:</i> Automated Electromechanical Systems<br><i>Thesis:</i> Influence of the number of phases of the system "frequency converter-asynchronous motor"<br>on its noise and vibration. <i>Advisors:</i> <a href="#">Prof. Dr. Alexander N. Golubev</a> , <a href="#">Prof. Dr. Viktor F. Glazunov</a> | <b>ISPEU, Russia</b><br>GPA 5.0/5.0 |
| 1997-2002  | <b>Professional Russian-English Translator</b><br><i>Certification Task:</i> Abstract Translation of Master Thesis in Major Field   | <b>ISPEU, Russia</b><br>GPA 5.0/5.0 |
| 1996-2000  | <b>Bachelor of Engineering &amp; Technology</b><br><i>Major Field:</i> Electrical Engineering, Electromechanics, Electrotechnology<br><i>Thesis:</i> Servo-Drive Tracking an Object with Logarithmically Changing Speed<br><i>Summa cum laude;</i> the highest overall grade rating among ~360 department graduates   | <b>ISPEU, Russia</b><br>GPA 5.0/5.0 |

## JOURNAL ARTICLES

1. Zykov, V., Mytilinaios, E., Desnoyer, M., Lipson, H., (2007) [Evolved and Designed Self-Reproducing Modular Robotics](#), *IEEE Transactions on Robotics*, Vol. 23. No. 2, pp. 308 - 319.
2. Bongard, J., Zykov, V., Lipson H., (2006) [Resilient Machines through Continuous Self-Modeling](#), *Science*, Vol. 314. No. 5802, pp. 1118-1121.
3. Zykov V., Mytilinaios E., Adams B., Lipson H., (2005) [Self-reproducing machines](#), *Nature*, Vol. 435 No. 7038, pp. 163-164.
4. Golubev, A, N., Zykov, V., (2003) [Mathematical model of an induction motor with a different number of stator and rotor phases](#) (In Russian), [English translation](#), *Electrotechnika*, Moscow, Russia, No. 7, pp. 35-40.

## CORRESPONDENCE

5. Conduit, R., Adami, C., Lipson, H., Zykov, V., Bongard, J. (2007) [To sleep, perchance to dream](#), *Science*, **315**: 1219-1220.
6. Lipson, H., Zykov, V., Bongard, J. (2007) [Response to: Prototype Resilient, Self-Modeling Robots](#), *Science*, **316**: 688.

## CONFERENCE PUBLICATIONS

7. Zykov, V., Williams, P., Lassabe, N., Lipson, H. (2008) [Molecubes Extended: Diversifying Capabilities of Open-Source Modular Robotics](#), in *Proceedings of the 2008 IEEE/RSJ Int. Conference on Robots and Systems, Self-Reconfigurable Robotics Workshop*.
8. Zykov, V., Chan, A., Lipson, H., (2007) [Molecubes: An Open-Source Modular Robotics Kit](#), in *Proceedings of the 2007 IEEE/RSJ Int. Conference on Robots and Systems, Self-Reconfigurable Robotics Workshop*.
9. Zykov, V., Lipson, H., (2007) [Experiment Design for Stochastic Three-Dimensional Reconfiguration of Modular Robots](#), in *Proceedings of the 2007 IEEE/RSJ Int. Conference on Robots and Systems, Self-Reconfigurable Robotics Workshop*.
10. Bongard, J., Zykov, V., Lipson, H., (2006) [Automated Synthesis of Body Schema using Multiple Sensor Modalities](#), *Proceedings of the Tenth International Conference on Artificial Life (ALIFE X)*, pp.220-226.
11. Lipson, H., Bongard, J., Zykov, V., Malone, E., (2006) [Evolutionary Robotics for Legged Machines: From Simulation to Physical Reality](#), *Proceedings of the 9th International Conference on Intelligent Autonomous Systems*, University of Tokyo, Tokyo, Japan, March 7-9, 2006, pp. 11-18.
12. Zykov, V. and Lipson, H., (2006) [Fluidic Stochastic Modular Robotics: Revisiting the System Design](#), *Proceedings of Robotics Science and Systems*, Philadelphia PA, Aug. 2006.
13. Tolley, M., Zykov, V., Lipson, H., Erickson, D., (2006) "[Directed Fluidic Self-Assembly of Microscale Tiles](#)" *Micro-Total Analysis Systems (uTAS) 2006*, Tokyo, Japan, Oct. 2006.
14. White P., Zykov V., Bongard J., Lipson H., (2005) [Three Dimensional Stochastic Reconfiguration of Modular Robots](#), *Proceedings of Robotics Science and Systems*, MIT, Cambridge MA, June 8-10.
15. Zykov V., Bongard J., Lipson H., (2005) [Co-evolutionary Variance Can Guide Physical Testing in Evolutionary System Identification](#), *Proceedings of the 2005 NASA/DoD Conference on Evolvable Hardware*, June 2005, Washington DC, pp. 213-220.
16. Lipson H., Bongard J., Zykov V., (2005) [Co-Evolutionary Methods in System Design and Analysis](#), *15th International CIRP Design Seminar*, Shanghai, China.
17. Zykov, V., Bongard, J. C., Lipson, H., (2004) [Evolving Dynamic Gaits on a Physical Robot](#). In: *Late Breaking Papers for the 2004 Genetic and Evolutionary Computation Conference (GECCO)*, Seattle, WA.
18. Golubev, A. N., Zykov, V., Ignatenko, S. V., (2002) [Computer-simulation derived investigation of vibration and noise properties of m-phase induction motors](#) (In Russian). In: *Procs. of Seminar in Electrical Engineering*, ISPEU, Ivanovo, Russia.
19. Golubev, A. N., Kadnikov, S. V., Zykov, V., Lapin, A. A., Subbotin, M. V., (2002) Alternating current motors inductive parameters definition using the integral equations method. In: *Depositions of All-Russian Institute of Scientific Research and Technical Information*, 22 p., Moscow, Russia.
20. Golubev, A. N., Ignatenko, S. V., Zykov, V., Subbotin, M. V., (2000) 2n-phase induction motor supplied by the n-phase power source. In: *Depositions of All-Russian Institute of Scientific Research and Technical Information*, 14 p., Moscow, Russia.
21. Golubev, A. N., Zykov, V., Subbotin, M. V., (2000) [Simulation-based investigation of 2n-phase induction motor supplied by n-phase power source](#) (In Russian). In: *Procs. of Seminar in Electrical Engineering*, ISPEU, Ivanovo, Russia.

## THESES

22. Zykov, V. (2008) [Morphological and Behavioral Resilience against Physical Damage for Robotic Systems](#). A dissertation presented to the faculty of the Graduate school of Cornell University in partial fulfillment of the requirements for the Degree of Doctor of Philosophy, Cornell University, Ithaca, USA.
23. Zykov, V. (2002) [Influence of the number of phases of the system "frequency converter-asynchronous motor" on its noise and vibration](#) (in Russian). A master's thesis presented to the faculty of the Department of Electromechanical Engineering of Ivanovo State Power Engineering University in partial fulfillment of the requirements for the Degree of Master of Engineering and Technology, ISPEU, Ivanovo, Russia.

24. Zykov, V. (2000) [Servo-Drive Tracking an Object with Logarithmically Changing Speed](#) (in Russian). A bachelor's thesis presented to the faculty of the Department of Electromechanical Engineering of Ivanovo State Power Engineering University in partial fulfillment of the requirements for the Degree of Bachelor of Engineering and Technology, ISPEU, Ivanovo, Russia.

## PROFESSIONAL EXPERIENCE

- 6/2008-present Research Scientist at Makani Power, Inc. Major areas of responsibility:
- Lead a team of 3 Ph.D. researchers involved in Makani Power Inc. collaboration with MIT on DARPA [Programmable Matter](#) program. Objective: determine chained polymer geometries capable of deterministic folding into arbitrary 3D shapes. Prove such feasibility theoretically and obtain the second stage of DARPA funding – successfully achieved by Oct. 2008.
- Lead a team of 3 research engineers (1 Ph.D., 2 M.S.) in the development of air-borne electrical power extraction, conversion, and distribution system for the kite wind power plant developed by Makani Power Inc. A compact custom regenerative high voltage brushless DC motor controller has been designed and successfully prototyped between July and December 2008. Second prototype has been fabricated by March 2009, tested, and accepted as final production version.
- Lead the development of a compact autonomous marine kite wind power extraction and hybrid towing system. This project has been initiated in March of 2009, and, to date, the design successfully passed two rounds of internal and external technical reviews and has been accepted for implementation and testing.
- 1/2008-5/2008 Postdoctoral Associate at Sibley School of Mechanical and Aerospace Engineering, Cornell University. Supervised the team of 3 undergraduate students, one graduate student, and one postdoc collaborating on the development of an open-source modular robotics research system [Molecubes](#). The success of the project was marked by the adoption of the developed robotic system by Festo Didactic, an international leader in the area of industrial vocational training, as a curriculum development component. Operational Molecubes were showcased by Festo at Hannover Messe 2009 in their innovative technologies section.
- 1/2005-12/2007 Research Assistant at Sibley School of Mechanical and Aerospace Engineering, Cornell University. Responsibilities included full cycle of robot design, construction, deployment, testing and experimentation carried out for a variety of robotic systems, including but not limited to all the systems shown in “Academic Research Experience” section. Specific tasks included robot structural design, parts manufacture and/or outsourcing, procurement, fabrication supervision, assembly, testing; PCB design, gerber file generation, sourcing of components and fabrication inside of the U.S. and abroad, supervision of outsourced fabrication, assembly of complete robots, firmware and software design, deployment, testing and operation; supervision and consulting for a variety of undergraduate, graduate, and postdoctoral research projects.
- 8/2003-12/2004 Teaching Assistant at Sibley School of Mechanical and Aerospace Engineering, Cornell University. Assisted in teaching laboratory in Heat Transfer, classes of Mechanical Design and Mechatronics. *Named Sibley School Exceptional Service Teaching Assistant*
- 9/2002-6/2003 Research Assistant at Electrical Engineering Dept. of Ivanovo State Power Engineering University, Ivanovo, Russia. Research responsibilities included design of high power multi-phase induction motor electric drives for low mechanical vibration and noise, systemic and parametric optimization thereof.
- 3/2002-6/2003 Expert in Electrical and Mechanical Engineering, Professional Translator at [RusLAN Ltd.](#), technical documents and software localization company, Ivanovo, Russia. Translated and supervised translation of web contents and technical documents for Novell, GE, Hewlett Packard, Siemens, Nokia, JVC, etc.
- 1/2002-3/2002 Call center hardware and software development at [Ivtelecom Corp.](#), Ivanovo, Russia.
- 1/2001-5/2001 Injection engines controller technician at Automotors Ltd., Ivanovo, Russia. Responsibilities included diagnosis of injector car engine controller failures, controller and peripheral on-board hardware repair and maintenance, controller re-programming and in-car testing.
- 8/2000-3/2002 Mobile crane electronic safety equipment and on-board recorders technician at [Kranmash Ltd.](#) (mobile crane maintenance company), Ivanovo, Russia. Responsibilities included installation, maintenance, diagnosis, and repair of a variety of mobile crane safety devices, such as overload protection devices, on-board recorders, electrical transmission line over-proximity

protection devices, etc. Mobile crane operation skills were also mandatory for on-board operation verification and calibration of all installed electronic equipment.

9/1999-10/1999 Programmable pipe manufacturing tools operation and maintenance intern at [Volgorechensk Pipe Plant, Gazprom Corp.](#), Volgorechensk, Kostroma region, Russia. Internship project concentrated on understanding the programming procedures and physical operation of an endless welded pipe cutting tool, programming and physical testing of a series of parametrically different pipe cutting sequences, which were later used for actual pipe production.

## ACADEMIC RESEARCH EXPERIENCE

2007-2009



### Open Source Modular Robots at [www.molecubes.org](http://www.molecubes.org)

CCSL, Cornell

The appeal of modular robotics is in their potential versatility, robustness, and low cost of manufacture, however, these advantages have yet to be realized. Due to demanding level of expertise and prohibitively high costs of fabrication and operation, majority of research in this area is limited to few specialized labs at select universities. We believe that by making this technology open and available to greater numbers of researchers, enthusiasts, and hobbyists we can remove barriers to entry and accelerate progress in the field. Through our Molecubes.org wiki, we provide all interested researchers and enthusiasts with complete blueprints for an open source, expandable modular robotic system. (with *Phelps Williams, Nicolas Lassabe, Andrew Chan, and Hod Lipson*)

2005-2007



### Stochastic Reconfiguration of Modular Robots in 3D

CCSL, Cornell

The goal of this project is to achieve dynamically re-programmable three-dimensional self-assembly and reconfiguration of zero-degree of freedom modular robots, incapable of autonomous locomotion and stripped of individual actuators, power supplies, and motion controllers. Global stochastic actuation is preferred for scaling up the number of modules in the modular robotic system, individual module size reduction, and structure simplification. (with *Hod Lipson and, initially, Paul White*)

2005-2006



### Robot Self-Modeling for Functional Damage Compensation

CCSL, Cornell

Animals sustain the ability to operate after injury by creating qualitatively different compensatory behaviors. Although such robustness would be desirable in engineered systems, most machines fail in the face of unexpected damage. Here we present a robot that can recover from such change autonomously, through continuous self-modeling. A four-legged machine uses actuation-sensation relationships to indirectly infer its own structure, and it then uses this self-model to generate forward locomotion. When a leg part is removed, it adapts the self-models, leading to the generation of alternative gaits. This concept may help develop more robust machines and shed light on self-modeling in animals. (with *Josh Bongard and Hod Lipson*)

2004-2005



### Machine Self-reproduction

CCSL, Cornell

Self-reproduction is central to biological life for long-term sustainability and evolutionary adaptation. Although these traits would also be desirable in many engineered systems, the principles of self-reproduction have not been exploited in machine design. Here we present simple machines that act as autonomous modular robots and are capable of physical self-reproduction using a set of cubes (with *Stathis Mytilinaios and Hod Lipson*)

2003-2004



### Nonaped – In-Hardware Legged Robot Controller Evolution

CCSL, Cornell

The goal of this project was to evolve versatile locomotion controllers in hardware, on a physical robot. Nonaped is a pneumatic parallel actuated robot with 12 internal non-articulated degrees of freedom. Our initial goal was to evolve a dynamic gait on a physical robot. Six hardware evolutionary runs were carried out, and resulted in several dynamic locomotion patterns. All evolved gaits use open-loop controllers. The results of this work laid foundation for the project in robot-self modeling and damage compensation (see above) with greatly reduced amount of hardware experimentation, as compared to physical evolution. (with *Josh Bongard and Hod Lipson*)

- 2000-2003 **Multiphase induction motor drive controlling its own noise (MEng thesis)** **ISPEU, Russia**  
Multi-phase induction motor simulator was designed that provides high precision estimates of actual currents induced in physical squirrel-cage rotor's rods of arbitrarily specified induction motor for all modes of operation. Using the current estimates, the magnetic induction distribution along the air clearance and the radial and tangential forces distribution can be dynamically obtained. This simulator was used to devise new real-time noise control methods for multiphase induction drives.
- 2000-2001 **Textile production line control, coordination and stability** **ISPEU, Russia**  
Distributed controller was designed and analyzed for a multi-linked system with drifting parameters. Additional research was carried out in textile technology to provide the system's robust operation and quality fabric output despite process parameter variations. Multiple drives coordination was conditioned by throughput requirements. Extensive system stability investigations were carried out.
- 2000-2002 **Dexterous manipulator control** **ISPEU, Russia**  
High bandwidth precision positioning system was designed for a 3-d.o.f. manipulator. For precise real-time trajectory control and backlash reduction, direct drive joint actuation system was designed. Individual joint drive controllers were compensated for mutual inertial interference with a system of sensors and observers.
- 1999-2000 **Electrical drive system optimized for object tracking (Bachelor's Thesis)** **ISPEU, Russia**  
Servo drive control algorithms for precise guidance control were investigated. Multiple-loop and modal control systems for a tracking servo drive were designed and their performance was compared. Both systems used real-time object position estimation and prediction; controllers operated according to the object-specific servo drive control algorithms.
- 1999-2000 **2n-phase induction motor supplied by the n-phase power source** **ISPEU, Russia**  
Additional reliability source for the multiphase induction motor drives was established: a simulator was developed for a 2n-phase induction motor with power supplied by the n-phase power source.
- 1999 **Induction motor-oriented variable frequency digital control system** **ISPEU, Russia**  
Control system performance was tested experimentally and on a simulator with and without accounting for the magnetization curve of the induction motor. As a result, taking into account the magnetization curve did not significantly influence the performance of a control system.

## GRANTS: ASSISTANCE WITH PROPOSALS AND KEY PERSONNEL

1. Lipson H. (2007) *A Modular Reconfigurable Robotic Platform for Research in Machine Resiliency and Adaptation*, Microsoft Gift, \$105,000 2007-2008
2. Lipson H. (2007) *A Modular Reconfigurable Platform for Robotics Education*, Festo AG & Co. KG, \$89,000 2007-2008
3. Lipson H., Hornby G. (2004) *Evolutionary algorithms for recovery of physical robot functionality in unanticipated conditions*, NASA, \$474,394 2004-2006
4. Lipson H., (2003) *Embedded Systems for Evolutionary Robotics*, Microsoft unrestricted gift, \$25,000, 2003-2004

## PATENTS

US Patent Application No. 12/455,313, Transport Power Generation Using a Wing Structure.

## TEACHING EXPERIENCE

- Teaching Assistant **Sibley School of Mechanical and Aerospace Engineering, Cornell**
- Fall 2004 M&AE 378 ***Mechatronics***  
Assisted to Prof. Ephrahim Garcia
- Spring 2004 M&AE 225 ***Mechanical Synthesis***  
Assisted to Prof. Hod Lipson **Named Sibley School Exceptional Service Teaching Assistant**
- Fall 2003 M&AE 427 ***Laboratory in Fluid Mechanics and Heat Transfer***  
Assisted to Prof. Elisabeth Mills Fisher
- Teaching Assistant **ISPEU, Russia**
- Fall 2001 ***Laboratory in Electrical Drive Automation Systems***  
Assisted to Prof. Alexander Nikolayevich Shiryaev

## INVITED TALKS

1. *Self-Sustainable Robotics through Morphological and Behavioral Adaptation*, seminar talk at the Department of Mechanical Engineering at Northwestern University, February 12, 2008
2. *Self-Sustainable Robotics through Morphological and Behavioral Adaptation*, seminar talk at the Department of Mechanical Engineering at Yale University, February 6, 2008
3. *Self-Sustainable Robotics through Morphological and Behavioral Adaptation*, research presentation for the Department of Mechanical Engineering at Carnegie Mellon University, January 29, 2008
4. *Making Robots Hard to Break*, presentation at Makani Power Inc., Alameda, CA, January 14, 2007
5. *Comprehensive Resilience for Robotic Systems*, Seminar of the Chair of Electrical Drive and Industrial Automation, Ivanovo State Power Engineering University, Ivanovo, Russia, Dec. 29, 2006
6. *Comprehensive Resilience for Robotic Systems*, Seminar of the Chair of Theoretical Mechanics, Bauman Moscow State Technical University, Moscow, Russia, Dec. 28, 2006
7. *Robots That Cannot Be Broken?* Research presentation at Mechanical Engineering Colloquium, Universidad de Malaga, Malaga, Spain, Nov. 16, 2006
8. *Robots That Cannot Be Broken?* Presentation at Dynamics, Systems and Control seminar, Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, Nov. 14, 2006
9. *Robots That Cannot Be Broken?* Research presentation at iRobot Corp., Burlington, MA, Nov. 3, 2006
10. *Robots That Cannot Be Broken?* Research presentation at CSAIL MIT, Cambridge, MA, Nov. 2, 2006
11. *Modular Robotics: Paving the Road towards Scalable Self-Reconfigurable Machinery*, Systems and Dynamics Group Seminar, Cornell University, Ithaca, NY, Mar. 28, 2006
12. *Approaches to Physical Robot Damage Recovery Using Evolutionary Algorithms*, NASA Ames Research Center, Mountain View, CA, Nov. 18, 2005
13. *Bio-Inspired Robotics: From Evolving Robots to Self-Replicating Machines*, Controls Group Seminar, UCSB, Santa Barbara, CA, Aug. 12, 2005
14. *Bio-Inspired Robotics: From Evolving Robots to Self-Replicating Machines*, Orion Multisystems, Santa Clara, CA, Aug. 8, 2005
15. *Automatic design of locomotion controller for a legged robot through physical evolution. Example of artificial kinematic physical self-replication*, Colloquium of Electrical Drive Chair, Ivanovo State Power Engineering University, Ivanovo, Russia, Aug. 11, 2004
16. *Evolutionary Robotics: Evolving Motion Controller on a Physical Multi-Legged Robot*, Controls Group Seminar, UCSB, Santa Barbara, CA, June 25, 2004
17. *Computer-simulation derived research of the 2n-phase induction motor supplied by the n-phase power source*, Seminar in Electrical Engineering, ISPEU, Ivanovo, Russia, June 22, 2002
18. *Computer-simulation derived investigation of vibration and noise properties of m-phase induction motors*, Seminar in Electrical Engineering, ISPEU, Ivanovo, Russia, Feb. 3, 2000

## SELECTED MEDIA COVERAGE

**Science News:** [Unstoppable Bot: Armed with self-scrutiny, a mangled robot moves on](#) / [print 11/18/2006](#)  
**MIT Technology Review:** [Self-aware robot that can spot damage and make allowances](#) / [cached 11/17/2006](#)  
**National Geographic News:** [Robot Senses Damage, Learns to Walk Again](#) / [cached 11/17/2006](#)  
**Slashdot:** [New Robot Can Sense Damage, Compensate](#) / [cached 11/17/2006](#)  
**New Scientist:** [Thoughtful robot adapts to injury](#) / [cached 11/17/2006](#)  
**Nature News:** [Injured robots learn to limp](#) / [cached 11/16/2006](#)  
**Scientific American:** [Resilient Robot Hobbles Along, Even if Injured](#) / [cached 11/16/2006](#)  
**Discovery News:** ['Starfish' Robot Recovers From Injury](#) / [cached 11/16/2006](#)  
**ScienceNOW Daily News:** [New Robot Shrugs Off Injury](#) / [cached 11/16/2006](#)  
**Science News:** [In Its Own Image: Simple robot replicates itself block by block](#) / [cached 05/14/2005](#)  
**NPR Science Friday:** [Self-Replicating Robots / Science of Sexual Abuse](#) / [cached 09/24/2009](#)  
**Discovery Channel:** [Robot Replicates Itself](#) / [cached 05/12/2005](#)  
**Wired News:** [Go Forth and Multiply Little Bot](#) / [cached 05/12/2005](#)  
**Innovations report (Germany):** [Cornell researchers build a robot that can reproduce](#) / [cached 05/12/2005](#)  
**NPR:** [Birds Do It, Bees Do It... Now Robots Do, Too](#) / [cached 09/24/2009](#)  
**Slashdot:** [Self-Replicating Robots](#) / [cached 05/11/2005](#)  
**National Geographic:** [New Robot Reproduces on Its Own](#) / [cached 05/11/2005](#)  
**BBC News:** [US robot builds copies of itself](#) / [cached 05/11/2005](#)  
**Nature News:** [Robots Master Reproduction](#) / [cached 05/11/2005](#)  
**Le Monde (France):** [Quand les robots se «reproduiront» à l'infini](#) / [print 09/30/2007](#)

## RESEARCH SUPERVISION

**Nicolas Lassabe** (January – May 2008) “Molecubes: Open-Source Reconfigurable Modular Robotic System”, development of a dynamic interactive modular robotics simulator – Postdoctoral Internship Project

**Phelps Williams** (August 2007 – May 2008) “Molecubes: Open-Source Reconfigurable Modular Robotic System”, development of robot firmware infrastructure and controller unit – Master of Engineering Research Project

**Andrew H. Chan** (May 2007 – May 2008) “Molecubes: Open-Source Reconfigurable Modular Robotic System”, implementation of a visual user interface and physical simulation software – Undergraduate Research Project

**Hang Li** (August 2007 – May 2008) “Molecubes: Open-Source Reconfigurable Modular Robotic System”, evolving behaviours for modular robotic assemblies – Undergraduate Research Project

**Sarah Bates**, *currently a graduate student at MIT* (August 2006 – May 2007) “Amorphous Robotics”, robot hardware design - Undergraduate Research Project

**Adrian Wong**, *currently an M.Eng. student at Cornell* (August 2006 – May 2007) “Amorphous Robotics”, robot electronics design - Undergraduate Research Project

## PROFESSIONAL ACTIVITIES

**Journal reviewer:** IEEE Transactions on Automation Science and Engineering, Journal of Intelligent and Robotic Systems, International Journal of Robotics Research, IEEE Transactions on Robotics

**Conference reviewer:** 2007 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2008 and 2010 IEEE International Conference on Robotics and Automation (ICRA), 2008 Genetic and Evolutionary Computation Conference (GECCO)

**Book reviewer:** K. Stoy, D. Brandt, D. J. Christensen, “An Introduction to Self-Reconfigurable Robots”, MIT Press, 2008

**Member:** IEEE Robotics and Automation

## AWARDS AND DISTINCTIONS

- Molecubes v.2 adopted into Festo Didactic curriculum and demoed at Hannover Messe, April 20-24, 2009 [↗](#)
- Molecubes invited into MoMA exhibition *Design and the Elastic Mind* from February 19 to May 12, 2008 [↗](#)
- Winner of Microsoft Ultimate Architect III Contest, San Diego, CA, June 30, 2004 [↗](#)
- The Sibley School Exceptional Service Teaching Assistant Award, presented by the Sibley School of Mechanical and Aerospace Engineering, Cornell University, May 2004 [↗](#)
- DAAD (German Academic Exchange Service) award for research in Electrical & Mechanical Engineering, sponsored 2-week training mission to Germany, May 2000
- Winner of Ivanovo State Power Engr. University Students' Contest in Descriptive Geometry, January 1997
- Winner of ISPEU Students' Contest in the English Language, Ivanovo, Russia, April 1998
- Winner of ISPEU Students' Contest in Electrical Engineering, Ivanovo, Russia, May 1998
- 1st Overall Score in Electromechanical Department, ISPEU, Ivanovo, Russia, November 1996 – June 2002
- Dean's List, ISPEU, Ivanovo, Russia, January 1997 – June 2002
- Silver Medal for Outstanding Scholastic Achievements at High School awarded by Russian Ministry of Education, Ivanovo, Russia, June 1996
- Multiple Prize Winner in High School Students' Contests in Math and Physics, Ivanovo, Russia, 1992-1996
- Distinctions in regional amateur weightlifting competitions 1996, 1999.

## OUTREACH ACTIVITIES

Molecubes included in MoMA exhibition *Design and the Elastic Mind* from February 19 to May 12, 2008 [↗](#)

Molecubes.org: Wiki web site devoted to building open source reconfigurable modular robots, August 2007 [↗](#)

Demos and talk about Starfish Robot for Cayuga Heights Elementary School students, June 2007, Ithaca NY [↗](#)

Presentation on adaptive robotics at the Ithaca Science Center, Feb 2007, Ithaca, NY

Presentation on adaptive robotics for Nottingham High School students, Feb 2007, Syracuse, NY


Demos and discussions at Science Day at Cayuga Heights Elementary School, June 2004, Ithaca, NY [↗](#)

## PROFESSIONAL REFERENCES


### 1. Dr. Hod Lipson

*Associate Professor,  
Joint Mechanical & Aerospace Engineering  
and Computing & Information Science  
Cornell University*  
[hod.lipson@cornell.edu](mailto:hod.lipson@cornell.edu)  
+1 (607) 255-1686  
Sibley School of Mech. & Aerospace Engineering,  
216 Upson Hall, Cornell University  
Ithaca, NY 14853-7501 USA 

### 3. Dr. Francis C. Moon

*Joseph C. Ford Professor  
Mechanical and Aerospace Engineering  
Member, National Academy of Engineering  
Curator, Cornell Collection of  
Reuleaux Kinematic Models  
Cornell University*  
[fc3@cornell.edu](mailto:fc3@cornell.edu)  
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Ithaca, NY 14853-7501 USA 

### 5. Dr. Daniela Rus

*Professor of Electrical Engineering and Computer  
Science, Co-Director of the Computer Science and  
Artificial Intelligence Lab, Center for Robotics, MIT*  
[rus@csail.mit.edu](mailto:rus@csail.mit.edu)  
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### 7. Dr. Gregory S. Hornby

*Senior Scientist,  
Department of Computer Science  
University of California, Santa Cruz,  
Intelligent Systems Division  
NASA Ames Research Center*  
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### 9. Dr. Corwin Hardham

*Co-CEO and CTO, Makani Power, Inc.  
Co-Founder and Partner, Squid-Labs, LLC  
Co-Founder, WakeKite, Inc.  
Advisor, Potenco, Inc.*  
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Alameda, CA 94501 USA


### 11. Dr. John C. Malone,

*Chairman of Liberty Media Corporation, CEO of Discovery Holding Company *  
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