William La Cava

[122 Hawley St., Northampton, MA, 01060][413-320-0544][wlacava@umass.edu]

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Education

2012 - today	PhD Candidate, Mechanical Engineering, University of Massachusetts Amherst
2009 - 2010	M.Eng., Mechanical Engineering, Cornell University
2005 - 2009	B.S., Mechanical Engineering, Cornell University

Research Experience

2012 - today	**PhD Candidate, University of Massachusetts Amherst**
	Committee: Kourosh Danai, Lee Spector, Matthew Lackner
	Dissertation: Automatic model form development and adaptation
	NSF IGERT fellow researching offshore wind energy applications
Jun–Aug 2015	**Visiting Researcher, Biosystems and Integrative Sciences Institute, University of Lisbon**
	Hosts: Sara Silva, Leonardo Vanneschi
	Subject: Multiclass classification of complex systems using genetic programming
2010 - 2012	**Research Scientist, National Renewable Energy Laboratory (NREL)**
	Supervisors: Paul Veers, Jonathan Keller
	Lead engineer for the Gearbox Reliability Collaborative, a consortium involved in wind turbine gearbox testing, data analysis, and numerical modeling
	Designed and conducted drivetrain simulation and testing programs for a 3 MW wind turbine R&D project
2008 - 2010	**Lead Engineer of Mechanical Power Systems, Cornell 100+ MPG Team**
	Advisor: Albert George
	Design, fabrication and testing for a hybrid-electric vehicle that competed in the Automotive X-Prize and won the 2011 Green Grand Prix, achieving over 120 MPG
2007 - 2008	**Independent Research, Cornell Computational Synthesis Laboratory**
	Advisor: Hod Lipson
	Employed inverse kinematics and machine learning for object recognition to train a mobile robot with a 5 degree-of-freedom arm and gripper to retrieve objects

Teaching Experience

2014 - 2015	**Teaching Assistant & Lecturer**
	I have taught of lectures for the following courses: System Dynamics; Control Systems Laboratory; Offshore Wind Design
	Topics: linearization; state-space representations; system identification; parameter estimation; and wind turbine control design
Jun - Aug 2015	**NSF REU Mentor**
	Mentored an undergraduate summer project: Using genetic programming to automatically develop models from observational data

Awards

2015	Best Paper Nomination, Genetic and Evolutionary Computation Conference (GECCO)
2014	XSEDE Startup Allocation Award: Automatic Identification of Dynamic Models for Complex Systems (PI)
2012	NSF Fellowship, IGERT: Offshore Wind Energy Engineering, Environmental Science, and Policy
2011	First Place, Cornell 100+ MPG Team, Green Grand Prix Competition

Publications

Articles in Review

La Cava, William, Danai, Kourosh, and Spector, Lee (2015). "Inference of Compact Nonlinear Dynamic Models by Epigenetic Local Search". In: *Engineering Applications of Artificial Intelligence*. In Review.

Journal Articles

La Cava, William, Kourosh Danai, Lee Spector, Paul Fleming, Alan D. Wright, and Matthew Lackner (2015b). "Automatic identification of wind turbine models using evolutionary multi-objective optimization". In: *Renewable Energy*. In Press.

La Cava, William G. and Kourosh Danai (2015b). "Gradient-based adaptation of continuous dynamic model structures". In: *International Journal of Systems Science* 47 (1), pp. 249–263. ISSN: 0020-7721. DOI: 10.1080/00207721.2015.1069905.

Guo, Yi, Jonathan Keller, and William LaCava (2014). "Planetary gear load sharing of wind turbine drivetrains subjected to non-torque loads". en. In: *Wind Energy* 18, pp. 757–768. ISSN: 1099-1824. DOI: 10.1002/we.1731.

LaCava, William, Yi Guo, Chris Marks, Yihan Xing, and Torgeir Moan (2013). "Three-dimensional bearing load share behaviour in the planetary stage of a wind turbine gearbox". en. In: *IET Renewable Power Generation* 7.4, pp. 359–369. ISSN: 1752-1416, 1752-1424. DOI: 10.1049/iet-rpg.2012.0274.

Conference Proceedings

La Cava, William and Kourosh Danai (2015a). "Model Structure Adaptation: A Gradient-based Approach". In: *ASME 2015 Dynamic Systems and Control Conference*. Columbus, Ohio: ASME.

La Cava, William, Kourosh Danai, Lee Spector, Paul Fleming, Alan D. Wright, and Matthew Lackner (2015a). "Automated Identification of Closed-Loop Wind Turbine Dynamics via Genetic Programming". In: *ASME 2015 Dynamic Systems and Control Conference*. Columbus, Ohio: ASME.

La Cava, William, Thomas Helmuth, Lee Spector, and Kourosh Danai (2015c). "Genetic Programming with Epigenetic Local Search". en. In: *Proceedings of the Genetic and Evolutionary Comptuation Conference*. ACM Press, pp. 1055–1062. ISBN: 978-1-4503-3472-3. DOI: 10.1145/2739480.2754763. **Nominated for Best Paper Award**.

La Cava, William, Lee Spector, Kourosh Danai, and Matthew Lackner (2014). "Evolving differential equations with developmental linear genetic programming and epigenetic hill climbing". en. In: *Companion proceedings of the 2014 conference on Genetic and Evolutionary Computation*. ACM Press, pp. 141–142. ISBN: 978-1-4503-2881-4. DOI: 10.1145/2598394.2598491.

LaCava, William, Jonathan Keller, and Brian McNiff (2012). "Gearbox reliability collaborative: test and model investigation of sun orbit and planet load share in a wind turbine gearbox". In: *AIAA 53rd Structures, Structural Dynamics, and Materials and Colocated Conferences, Honolulu, Hawaii*.

LaCava, William, Y. Xing, Y. Guo, and Torgeir Moan (2012). "Determining wind turbine gearbox model complexity using measurement validation and cost comparison". In: *European Wind Energy Association annual event, Copenhagen*.

LaCava, William, B McNiff, and J van Dam (2011). "NREL Gearbox Reliability Collaborative: Comparing In-field Gearbox Response to Different Dynamometer Test Conditions: Preprint". In: National Renewable Energy Laboratory.

Book Chapters

Kannappan, Karthik, Lee Spector, Moshe Sipper, Thomas Helmuth, William La Cava, Jake Wisdom, and Omri Bernstein (2015). "Analyzing a Decade of Human-Competitive ("HUMIE") Winners: What Can We Learn?" In: *Genetic Programming Theory and Practice XII*. Springer, pp. 149–166.

La Cava, William and Lee Spector (2015). "Inheritable Epigenetics in Genetic Programming". In: *Genetic Programming Theory and Practice XII*. Ed. by Rick Riolo, William P. Worzel, and Mark Kotanchek. Cham: Springer International Publishing, pp. 37–51. ISBN: 978-3-319-16029-0 978-3-319-16030-6.

Technical Reports

La Cava, William and Matthew Lackner (2015). *Theory manual for the tuned mass damper module in FAST 8*. Tech. rep. DOI:10.13140/rg.2.1.4565.9684. University of Massachusetts Amherst.

Keller, Jonathan, Hal F. Link, Yi Guo, William LaCava, Brian P. McNiff, and McNiff Light Industry (2011). *Gearbox reliability collaborative phase 1 and 2: testing and modeling results*. Tech. rep. National Renewable Energy Laboratory.

Link, H, W LaCava, J van Dam, B McNiff, S Sheng, R Wallen, M McDade, S Lambert, S Butterfield, and F Oyague (2011). *Gearbox reliability collaborative project report: findings from phase 1 and phase 2 testing*. Tech. rep. National Renewable Energy Laboratory, pp. 275–3000.

Software

La Cava, William (2015). *ellenGP*. DOI: 10.5281/zenodo.13927.

Video

La Cava, William (2013). *Offshore Wind in the Caribbean*. 2013 IGERT Video and Poster Competition. URL: https://vimeo.com/65178378.

Service

Organizer	Collaboration with University of Maine's Advanced Structures and Composites Center (2014)
	Gearbox Reliability Collaborative Annual Meeting, National Renewable Energy Laboratory (2011, 2012)
Member	Association of Computing Machinery (ACM)
	American Society of Mechanical Engineers (ASME)
	American Institute of Aeronautics and Astronautics (AIAA)
Referee	Renewable Energy Journal
	Wind Energy Journal
	AIAA Wind Energy Symposium (2014)
	ASME Dynamic Systems and Controls Conference (2015)

Volunteer & Outreach Activities

2013 - 2014	**Invited Science Teacher, Four Rivers Charter School**
	Taught two classes on wind energy
2011 - 2012	**Volunteer, Boulder Food Rescue**
	This organization has saved hundreds of thousands of pounds of left over food from grocery stores and bakeries and delivered it to homeless shelters and other community food stations.
2001 - 2005	**American Cancer Society Relay for Life**

Other Interests

Film	I write, direct, and produce short fictional films, including:
	"MADG" (2014), *Sound on Sound Film Festival* (premiere), *Florence Night Out*
	"Vacuumland Trilogy" (2008), *The Project Competition*
Music	Vice President, Fanclub Collective (2005 - 2010), a music promotion agency in Ithaca, NY
	I have written, recorded, and produced several albums
	Co-founder of a small record label that operates in Denver
Language	Spanish (proficient), Portuguese and Italian (beginner)
Sports	rock climbing, soccer