

Mariappan “Jawa” Jawaharlal, Ph.D.
Professor of Mechanical Engineering
California State Polytechnic University
3801 West Temple Avenue, Pomona, CA 91768

Phone: (909) 869-4127 (Office)
(909) 450-9190 (Cell)
Email: jmariappan@cpp.edu (office)
iawa@drjawa.com (Personal)

SUMMARY

Dr. Mariappan Jawaharlal (Dr. Jawa) is a Professor of Mechanical Engineering at the California State Polytechnic University, Pomona. Dr. Jawa is recognized as an outstanding educator for his innovative and engaging teaching pedagogy. He has received numerous honors including Northrop Grumman Award for Excellence in teaching and the Innovative Educator Award. Dr. Jawa is well known for his hands-on, guided discovery approach for learning. More recently, Dr. Jawa has been involved in the [CSU course redesign initiative](#) focused on redesigning bottleneck and high enrollment courses with technology to improve student learning.

Dr. Jawa is the founder and director of [Robotics Education through Active Learning \(REAL\)](#), a unique K-12 outreach robotics program, which now reaches thousands of students each year. This is the largest event of its kind in the nation and it culminates in an [Annual Robot Rally](#). The REAL initiative has inspired thousands of young students to pursue STEM education. He also helped develop [the Femeiner program](#) to inspire, engage and empower girls in middle and high school. The Femeiner program was recognized by White House in 2015 for increasing educational outcomes and opportunities for female Hispanic K-12 students. Dr. Jawa developed a 3-year curriculum including creative robotics, wearable technology and Raspberry Pi Robotics for Femeiners.

Dr. Jawa is a pioneer in developing engaging, online lessons. Well before online education became mainstream, he founded APlusStudent.com, an online supplemental, K-12 education in 1998 and developed over 800 interactive, learning modules. APlusStudent became an official content partner for Microsoft server and APlusStudent content was acquired by ProQuest in 2003.

Dr. Jawa’s professional interests are in the fields of product design, engineering entrepreneurship and biomimicry. His product design experience is diverse, and he has been instrumental in bringing many new products to the market from mere concepts. As a PI or collaborator, he has received funding exceeding \$1.5 million from various agencies. Dr. Jawa is a Fellow of Biomimicry Institute.

Dr. Jawa has over 20 years of industrial, academic and entrepreneurial experience. Before joining Cal Poly Pomona, He also served as a faculty at Rowan University, NJ and Kettering University, MI. At Rowan, Dr. Jawa was one of the early faculty members recruited to develop a brand new engineering program with a donation of \$100 million from Industrialist, Henry Rowan.

Dr. Jawa is passionate about education and focuses on K-16 and STEM education. He writes columns for [Huffington Post](#) on issues related to K-12 and higher education. Dr. Jawa is a marathon runner and a scuba diver. He recently ran across the Grand Canyon from Rim to Rim to Rim.

APPOINTMENTS

9/2009 – Present	<u>Professor</u> , California State Polytechnic University, Pomona
5/2006 – Present	<u>Founder and Director</u> , Robotic Education through Active Learning
1/2009 – 6/2009	<u>Director</u> , Center for Community Service Learning, Cal Poly Pomona
9/2003 – 8/2009	<u>Associate Professor</u> , California State Polytechnic University, CA
6/2002 – 9/2003	<u>E-Learning Director</u> , Experia Solutions, Minneapolis, MN
6/1999 – 6/2002	<u>Founder and President</u> , APlusStudent Inc., Mt. Laurel, NJ
9/1997 – 6/1999	<u>Associate Professor</u> , Rowan University, NJ
9/1994 – 9/1997	<u>Assistant Professor</u> , Kettering University (formerly GMI), MI
8/1986 – 7/1990	<u>Scientist</u> , Gas Turbine Research Establishment, Bangalore
9/1985 – 8/1986	<u>Engineer</u> , Central Machine Tool Institute, Bangalore

EDUCATION

Ph. D. in Mechanical Engineering, 1994, University of Massachusetts, Amherst, MA
M. S. with Honors in Mechanical Engineering, 1985, Peoples' Friendship University of Russia, Moscow

HONORS

- * Outstanding Community Service Award, Pomona Unified School District, 2011
- * Biomimicry Fellow, Biomimicry Institute, 2010
- * Northrop Grumman Excellence in Teaching Award, 2010
- * Innovative Design Educator Award, California Legislature, Assemblyman Curt Hagman, 2009
- * Professor of the Year, ASME and Pi Tau Sigma, 2008-2009
- * Rodes Professorship Award for outstanding teaching and research activities, GMI, 1995
- * Recognized as one of the outstanding Professors and Honored for being an effective and caring teacher, GMI Student publication *Technician*
- * ASME Curriculum Innovation Award, Recognizes exemplary innovations in Engineering Education. Awarded for developing and implementing an innovative Introductory Design course, 1996
- * Nominated for ASEE Dove Outstanding Young Faculty Award by GMI, 1996
- * Commended by US Senator Barbara Boxer for Service Learning Activities, 2005
- * Faculty for Training Samsung Engineers, 1996
- * Teaching Faculty for General Motors Technical Education Program, 1995 & 1996

ADMINISTRATION AND LEADERSHIP

- * Director, K-12 Robotics Outreach – One of the largest outreach program in the Nation
- * Director, Center for Community Service Learning Service Learning
- * Adviser, several startup companies. Helping them to launch crowd funding, product development and VC funding
- * Director, E-Learning, Experia Solutions
- * Migrant Education Summer Program

RESEARCH

- * Biomimicry – Engineering Design Inspired by Nature
- * Assistive Devices Design, Design Theory and Methodology

- * Mechanism Design, Robotics, and Optimization
- * Service Learning, Design for Sustainable Development and Affordability

TEACHING

- * Developed online learning modules in Engineering Mechanics.
- * Taught a number of engineering courses from freshmen to graduate level including introduction to engineering, statics, dynamics, strength of materials, kinematics, stress analysis, machine design, introduction to mechanical design, advanced mechanism design, introduction to Engineering, Robotics using basic stamp, solid Modeling, CAD, descriptive geometry, mechatronics, vibration, engineering clinics and capstone design.
- * Developed new courses in biomimicry for engineers, optimization, design visualization, engineering service learning, Arduino robotics and wearable technology.
- * Pioneered the use of Scenario-Based Learning Approach to teach fundamental concepts in engineering mechanics.
- * Produced and managed e-learning modules, simulations, multimedia courseware and hundreds of short, interactive lessons.

INDUSTRIAL EXPERIENCE

- * Design of mechanisms and subsystems for military aircraft engine applications
- * Design machine tools

ENTREPRENEURIAL EXPERIENCE:

- * Adviser, several startup companies and small businesses in Southern California including [STEM Center USA](#), which was featured on Shark Tank, Season 7 Episode 6.
- * Founded and developed [APlusStudent](#), an online supplemental education company from a mere concept to a leading K-12 content provider. Raised over \$600,000 in seed fund. APlusStudent offered hundreds of engaging, multimedia lessons and educational activities in K-12 math. APlusStudent was used by thousands of students, teachers and parents. *APlusStudent was an official content partner for Microsoft Class Server. APlusStudent content was acquired ProQuest in 2003.*

SERVICE AND PROFESSIONAL ACTIVITIES:

- * Founding Advisor, Cal Poly Pomona Chess Club
- * Founding Advisor, Engineers Without Borders, Cal Poly Pomona Student Chapter
- * Co-Advisor, Robotics Club, Cal Poly Pomona, 2008-2010
- * Chairman ASME Safety Award Committee, 2005-2006
- * ASME Design Education Committee Member, 2005-2006
- * Member, Organizing Committee 2006 ASEE – PSW Conference
- * Events Captain, Science Olympiad, 2004 & 2005
- * Volunteer, Habitat for Humanity, Lee County, AL
- * Undergraduate Student Advising (GMI and Cal Poly)
- * ASME faculty adviser (GMI and Rowan),
- * Adviser, Odyssey of the Mind Team (GMI)
- * Adviser, Autonomous vehicle design team (GMI)
- * Reviewer for journals (ASME, Mechanisms & Machine Theory)

* Reviewer for ASEE

GRANTS

- PI, CSU \$11,000, Lead faculty, Engineering Statics
- Motorola Innovation Grant \$25,000, 2015. A unique program using wearable technology to empower and inspire middle school and high school girls about STEM education
- Co-Pi, CSU Sustaining Success \$20,000, 2015. Grant is to conduct a workshop for CSU faculty to learn about course redesign integrating pedagogy and technology. PI: Dr. Angela Shih.
- PI, CSU Proven Course Redesign \$32,932, Vector Statics, 2015
- PI, CSU Promising Course Redesign \$34,628, Strength of Materials, 2015
- Time Warner Cable \$10,000, 2014-2015 for Annual Robot Rally
- PI, CSU Promising Course Redesign \$38,717, Vector Dynamics, 2014
- PI, CSU Promising Course Redesign \$36,790, Vector Statics, 2013
- PI, Motorola Innovation Grant \$50,000, 2012-2013
- Time Warner Cable \$25,000, REAL, 2012
- PI, Education Blue Print Ass. \$40,000, Smart Schools Grant, 2011
- Project Director, Time Warner \$25,000, REAL, 2011
- PI, NCIIA \$8,800, Posture Monitoring device, 2011
- PI, Motorola Innovation Grant \$26,000, Engage, Innovate, Contribute, 2010
- Senior Researcher, TWC \$15,000, School Robotics, 2009
- Co-PI, NSF-DUE #0934964 \$597,520, Robert Noyce Teacher Scholarship Program II, (with PI: Jared Stallones and Homeyra Sadaghiani)
- Co-PI, UTC \$5,000, Electrification of the Freight Train Network from the Ports of Los Angeles/Long Beach to Inland Empire, (With Frank Smith & Xudong Jia), 2007
- PI, NCIIA \$25,200, Learn, Serve and Prosper: Implementing Socially Responsible Entrepreneurial Projects, 2005
- Co-PI, Confidence Foundation \$50,000, School Robotics Initiative. PI: Dr. Cesar Larriva, 2008
- Co-PI, Confidence Foundation \$132,000, School Robotics Initiative, PI: Dr. Cesar Larriva, 2007
- Co-PI, NSF-EEC #0431974 \$96,600, Integrating Service-Learning into Engineering Curricula, (PI: Dr. Fan), 2004
- PI, NSF- ILI #9751387 \$64,196, Development of a New Multidisciplinary Undergraduate Mechatronics Laboratory, 1996
- Co-PI, NSF- ILI #9850563 \$55,600, Competitive Assessment Laboratory (PI: Anthony Marchese)
- Co-PI, NSF- CCLI #9950882 \$46,433, A Multidisciplinary Control Systems Laboratory (PI: Ramachandran)
- Co-PI, NSF- CCLI #9950609 \$19,927, Field Experiences for Undergraduate Engineers, (PI: Everett)

- PI, Product Realization Projects \$10,000, Product Realization Projects in undergraduate courses at GMI, REALIZATION Consortium (MIT, WPI & Cornell)

INTERNAL GRANTS

- * \$11,000(Approximately), Cal Poly Pomona Mini Grant, 2003-2008, 2011-2015, 2016
- * \$12,000 (Approximately), Cal Poly Pomona Service Learning Grant, 2004-2015
- * \$16,000, DOLCE - with team Members, Dr. Kim, Rezaei and Shih, 2006
- * \$25 ,000, Presidential Travel Award, 2003-2013
- * \$5,000, Cal Poly RSCA Grant, Disassembly Analysis, 2003-2004
- * \$10,000, GMI RI/I Grant, 1994-1996

OTHER FUNDING

- NISH Assistive Device Design, 2008 & 2009
- Dept. of Human Resources, MN \$43,000, E-learning courseware, State of Minnesota, Minneapolis, MN, 2003
- Horace Mann, IL \$57,700, Courseware using scenario-based learning approach (through Experia Solutions), 2002
- SENCO Inc., OH \$134,00, Air Motor Optimization with Berg & Navaz
- Knable & Associates Inc., MI \$10,000, A software translator from Snap™ to Adams™
- Means Industries, Saginaw, MI \$10,000, Parametric clutch assembly modeling

SELECTED BLOGS

[What's up With 'Chicks and Science?'](#)

[Running 50 Miles across Grand Canyon](#)

[An Open Letter to Fared Zakaria in Defense of STEM Education](#)

[Why is STEM boring?](#)

Read all blogs at

<http://www.huffingtonpost.com/dr-mariappan-jawaharlal/>

RECENT PRESENTATIONS AND WORKSHOPS

1. Becoming a Better Teacher, TEDx CPP to be held on April 7, 2016
2. Invited speaker, Seminario Internacional de BIOMIMESIS, Barranquilla, Colombia, March, 2014
3. Invited Speaker, Biomimicry Education Summit, Portland, Oregon, June, 2012
4. Invited Speaker, What would nature do?, TEDx Claremont Colleges, April, 2013
5. Femineers: A model for attracting and retaining girls in STEM. Presentation at the fifth, annual PLTW CA Conference, Riverside, CA, 2016 (With Ontiveros and Lukesh, Scott)
6. Femineers: Three year program for high school girls. Presentation at the third annual California STEM Symposium, Anaheim, CA, 2015 (with Cole, G., and Keshishyan, J.)
7. Jumpstart with Robotics, ASEE Annual Conference, Seattle, Washington, June, 2014
8. Training the Teachers: Robotics Workshop at Cal Poly Pomona, 2010-2016
9. Robotics workshop, Tianjin, Beijing and Shanghai, China, September, 2011
10. Robotics workshop, Multiple location, India, 2010-2015
11. Learn to Run workshops, 2010-2013

SELECTED PUBLICATIONS

1. Nemiro, J., Cesar, L. & Jawaharlal, M., under review, Developing Creativity in Elementary School Students through Robotics, The Journal of Creative Behavior.
2. Jawaharlal, M., Ellingwood, S. & Thokchom K., under review, Life Centered Design Using Morphological Chart, ASME IMECE 2016.
3. Widholm, S. and Jawaharlal, M., Cassowary Casques for Shock Absorption, under review, ASME IMECE 2016.
4. Anderson, K. and Jawaharlal, M., 2015, Using Cal Poly Pomona's Blackboard Learning Management Environment to Teach Capstone Design Courses, ELearn 2015, Maui, HI.
5. Casad, B. and Jawaharlal, M., 2012, Learning Through Guided Discovery – An Engaging Approach to K-12 STEM Education, Paper # AC 2012-3665, ASEE Annual Conference, San Antonio, Texas.
6. Jawaharlal, M., 2008, Developing and Implementing an Effective and Sustainable Engineering Service Learning Program, NCIIA 12th Annual Conference, March, Dallas, Texas.
7. Jawaharlal, M. and Rezaei, A., 2008, Socially Responsible Senior Projects, ASEE PSW Regional Conf., March, Flagstaff, Arizona.
8. Jawaharlal, M., Larriva, C. and Nemiro, J., 2007, School Robotics Initiative - An Outreach Initiative to Prepare Teachers and Inspire Students to Choose a Career in Engineering and Science, ASEE Pacific Southwest Conference, Reno, Nevada.
9. Fan, U., Jawaharlal, M. and Monemi, S., 2007, Enhancing Experiential Pedagogy with Interdisciplinary Engineering Service Learning Activities, International Forum of Teaching and Studies, Volume 3, No. 2, American Scholars Press.
10. Jawaharlal, M., Rezaei, A. and Monemi, S., 2007, Learn and Serve - Design Projects for the Community, ASEE Annual Conference and Exposition, June, Honolulu, HI.
11. Yang, S. and Jawaharlal, M., 2007, A General Purpose Sensor Board for Mechatronic Experiments, ASEE Annual Conference and Exposition, June, Honolulu, HI.
12. Rezaei, A., Jawaharlal, M., Kim, K. and Shih, A., 2007, On Development of a Hybrid Vector Statics, ASEE Annual Conference and Exposition, June, Honolulu, HI.
13. Kim, K., Rezaei, A., Jawaharlal, M. and Shih, A., 2007, Development of Online Hands-On Experiments for a Hybrid Vector Statics Course, ASEE Annual Conference and Exposition, June, Honolulu, HI.
14. Jawaharlal, M., 2007, *Rose Float Design Course*, ASEE Pacific Southwest Conference, April, Reno, NV.
15. Rezaei, A., Jawaharlal, M., Kim, K. and Shih, A., 2007, Lessons Learned from a Newly Developed Hybrid Vector Statics Course Based on Fundamental Concepts and Hands on Experiments, ASEE Pacific Southwest Conference, April, Reno, NV.
16. Jawaharlal, M., 2007, Entrepreneurial Projects at Cal Poly Pomona, NCIIA 11th Annual Conference, March, Tampa, FL.
17. Jawaharlal, M., Fan, U. and Monemi, S., 2006, Implementing Service Learning in Engineering Curriculum, ASEE Annual Conference, Chicago, IL.
18. Jawaharlal, M. and Ravi, V., 2006, Integrating Context-Based, Just-in time Activities in a Traditional Design Class, ASEE Pacific Southwest Conf., April, Pomona, CA.
19. Leopard, R. and Jawaharlal, M., 2006, Statics Visualization Kit, ASEE Pacific Southwest Conference, April, Pomona, CA.
20. Jawaharlal, M., 2006, Engaging Learners Through Designs That Matter, NCIIA 10th Annual Conference, March, Portland, OR

21. Jawaharlal, M., Fan, U. and Monemi, S., 2005, Enhancing Authentic Learning Experiences Through Service Learning, ASEE Pacific South West Regional Conference, Loyola Marymont, Los Angeles, CA.
22. Fan, U., Jawaharlal, M. and Monemi, S., 2005, Enhancing Experiential learning Pedagogy with Interdisciplinary Engineering Service learning Activities, NCUT, August, Beijing, China.
23. Jawaharlal, M., Fan, U. and Monemi, S., 2005, Engineering Service Learning and Entrepreneurship Opportunities, NCIIA 9th Annual Conference, March, San Diego, CA.
24. Jawaharlal, M., Shih, A. and Schrader, P., 2004, Use of Scenario Based Learning in Teaching Statics, Session 2666, ASEE Annual Conference, Salt Lake City, UT.
25. Jawaharlal, M., Shih, A., Schrader, P. and Elmore, R., 2004, Scenario-Based Learning and Multimedia in Improving Engineering Education, ASME 2004 Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Salt Lake City, Utah.
26. Shih, A., and Jawaharlal, M., 2004, Scenario-Based Learning Approach in Improving Undergraduate Engineering Education, ASME International Mechanical Engineering Congress and Exposition, Anaheim, CA.
27. Tavakoli, M., Mariappan, J. and Huang, 2003, Design for Assembly Vs. Design for Disassembly – A Comparison of Guidelines, ASME International Mechanical Engineering Congress, Washington, D.C.
28. Tavakoli, M. and Mariappan, J., 2000, Concurrent Teaching of Engineering Design, Analysis and Manufacturing, The International Journal of Mechanical Engineering Education, Volume 28, Number 4.
29. Ramachandran, P., Farrell, S. and Mariappan, J., 2000, A Multidisciplinary Control Systems Laboratory, ASEE Annual Conference and Exhibition, St. Louis, Missouri, Session 1526.
30. Ramachandran, P., Mariappan, J., et al., 1999, Teaching Quality: An Integrated Total Quality Management Approach to Technical Communication and Engineering Design, ASEE Middle Atlantic Section Regional Conference, West Long Branch, New Jersey, pp. 30-34.
31. Ramachandran, P., Marchese, A., Mariappan, J. and Schmalzel, J., 1999, The Sophomore Engineering Clinic: An Introduction to the Design Process Through a Series of Open Ended Projects, ASEE Annual Conference and Exhibition, Charlotte, NC, Session 2225.
32. Mariappan, J., and Marchese, A., 1998, TQM Approach to design in the sophomore engineering clinic, ASME International Mechanical Engineering Congress and Exposition, Paper No. 98-WA/DE-17, Anaheim, CA.
33. Mariappan, J., 1997, A Laboratory for Mechatronics Courses, ASEE Conference, Session on Laboratory Development for Mechatronics, Milwaukee, MN.
34. Tavakoli, M., Hammond, G., Mariappan, J. and Kowalski, H., 1997, Integrating Engineering Design, Analysis and Manufacturing at Sophomore Level, Proceedings of ASEE Annual Conference.
35. Mariappan, J., Cameron, T. and Berry, J., 1996, Multidisciplinary Undergraduate Mechatronic Experiments, Frontiers in Education Conference, Salt Lake City, UT.
36. Mariappan, J., and Berry, J., 1996, Mechatronics at GMI, Proceedings of Mechatronics, pp. 78-83, San Francisco, CA.
37. Mariappan, J., 1996, A Constraint Classification Scheme for Teaching Kinematics, ASEE Annual Conference, Washington, D.C.
38. Lundstrom, R., Mariappan, J. and Berry, J., 1996, Improving Teaching Quality Through Total Quality Management, ASEE Annual Conference, Washington, D.C.
39. Tavakoli, M., Hammond, G., Kowalski, H. and Mariappan, J., 1996, Concurrent Teaching of Engineering Design, Analysis and Manufacturing at Sophomore Level, ASME Curriculum Innovation Awards, pp. 12-15.

40. Mariappan, J. and Krishnamurty, S., 1996, A Generalized Exact Gradient Method for Mechanism Synthesis, Journal of Mechanisms and Machine Theory, V. 3, # 4, pp.413-421.
41. Krishnamurty, S., Soni, H. and Mariappan, J., 1996, Branching Determination in Spatial Mechanisms, Advances in Mech. Engineering, Narosa Publishing, pp. 153-167.
42. Mariappan J. and Krishnamurty, S., 1994, Determination of Branch Free and Circuit Free Solutions During the Synthesis of Multiloop Mechanisms, DE-Vol. 70, Proc. of the ASME Design Technical Conferences, pp. 329-336, Minneapolis, MN.
43. Mariappan, J. and Krishnamurty, S., 1993, Development of an Exact Gradient Approach for Optimal Synthesis of Mechanisms, DE-Vol. 65-1, Proc. of the ASME Advances in Design Automation Conference, Vol. 1, pp. 427-432, Albuquerque, NM.
44. Mariappan J. and Krishnamurty, S., 1993, Application of the Exact Gradient Approach in Optimal Synthesis of Mechanisms, DE-Vol. 65-1, Proc. of the ASME Advances in Design Automation, Vol. 1, pp. 433-440, Albuquerque, NM .
45. Mariappan J. and Krishnamurty, S., 1992, Using Exact Gradients in Mechanism Design, DE-Vol. 44-2, Proceedings of the ASME Advances in Design Automation Conf. Vol. 2, pp. 53-59, Scottsdale, AZ.
46. Jawaharlal and Arulraj, 1988, Integrated Approach to Design and Manufacture of Gas Turbine Components Using Group Theory, Defense Science Journal, Vol. 38, pp. 457-466.
47. Jawaharlal and Shetty, 1987, File Secrecy in a Multi-User Environment, Defense Science Journal, Vol. 37, pp.489-494.
48. Subhas, Venkateswaran and Jawaharlal, 1988, Development of Software Package for Integrated Computer-Aided Manufacturing of Jet-Engine Components Based on Group Technology, Proc. of II National Seminar on Computer Applications in Defense, Vol. 1.
49. Sundar and Jawaharlal, 1988, Computer Aided Analysis and Animation of Planar Mechanisms, Proc. of II National Seminar on Computer Applications in Defense, Vol. 1.

THESIS SUPERVISION

Supervised several MS and over 250+ BS projects

OTHER INTERESTS

- Accomplished marathon runner. Since 2010, completed 23 full Marathons including Chicago and Berlin marathons.
- Ran across Grand Canyon from Rim to Rim to Rim (53 miles) in 2015.
- Certified Scuba Diver since 2006.
- Bird watching