

# Kerr-Jia Lu

kjlu@gwu.edu  
<http://www.seas.gwu.edu/~kjlu/>  
U.S. Permanent Resident  
Residential contact info available upon request

Academic Center 723  
801 22<sup>nd</sup> St., N.W.  
George Washington University  
Washington, DC 20052  
Tel: 202.994.6929

## RESEARCH AND TEACHING INTERESTS

My research interests include nature/bio-inspired designs, compliant mechanism synthesis, kinematics and mechanism design, adaptive structures, evolutionary optimization methods, structural optimization, and biomimetic systems with embedded actuation and sensing. I am interested in teaching courses in design and manufacturing, solid mechanics, introduction to finite element analysis, structural optimization, compliant mechanism design, and continuous/discrete optimization.

## EDUCATION

**Ph.D. in Mechanical Engineering**, August, 2004  
**University of Michigan**, Ann Arbor, Michigan (GPA: 8.33/9.0)  
Dissertation: Synthesis of Shape Morphing Compliant Mechanisms  
Advisor: Professor Sridhar Kota

**M.S. in Mechanical Engineering**, August, 1999  
**University of Michigan**, Ann Arbor, Michigan (GPA: 8.32/9.0)

**B.S. in Mechanical Engineering**, June, 1997  
**National Taiwan University**, Taipei, Taiwan (GPA: 3.74/4.0)

## EXPERIENCE

**Assistant Professor**, September, 2004 – Present  
Department of Mechanical and Aerospace Engineering  
George Washington University, Washington, DC

- Research: Compliant mechanism synthesis; Shape morphing systems; Evolutionary optimization
- Teaching: MAE 191 Mechanical Design; ApSc 057 Analytical Mechanics I (Statics)

**Graduate Student Research Assistant**, June, 1998 – July 2004

Compliant Systems Design Laboratory, University of Michigan, Ann Arbor, Michigan

- Focused on the design of shape morphing compliant mechanisms that can enhance the performance and versatility of systems, such as aircraft wings and antenna reflectors
- Developed and implemented a systematic synthesis approach for morphing compliant mechanisms, involving discrete/continuous optimization, finite element analysis, and basic pattern recognition methods
- Developed a novel parameterization scheme using load paths to represent various structural topology and ensure structural connectivity
- Demonstrated the capability of the synthesis approach through compliant mechanism prototypes (created by rapid prototype machine: Stratasys FDM 3000)

**Graduate Student Instructor**, January – April, 2004

Department of Mechanical Engineering, University of Michigan, Ann Arbor, Michigan  
ME 452 DESIGN FOR MANUFACTURABILITY (an undergraduate level course)

- Worked with Professor Sridhar Kota and Professor Donald Malen
- Class size: 72 on-campus + 34 off-campus students
- Major course content: Conceptual Design, Design Principles, Product Development, Design for Assembly, Material Selection, Robust Design using Taguchi Method

**Graduate Student Instructor**, September – December, 2000

Department of Mechanical Engineering, University of Michigan, Ann Arbor, Michigan  
ME 551 MECHANISM DESIGN (a graduate level course)

- Worked with Professor Sridhar Kota
- Class size: 50 on-campus + 20 off-campus students from GM and DaimlerChrysler
- Assisted students with term projects, class materials, course software, and homework
- Provided training sessions for course software: Lincages and ADAMS
- Communicated with off-campus students via emails and phone to resolve problems encountered in distance-learning
- Maintained and updated course website

**Graduate Student Instructor**, September – December, 1999

Department of Mechanical Engineering, University of Michigan, Ann Arbor, Michigan  
ME 450 DESIGN AND MANUFACTURING III (a senior capstone project course)

- Worked with Professor Panos Y. Papalambros and Professor Sridhar Kota
- Created and maintained the course website for a class of 88 students (22 team projects)
- Advised 4 student teams, two of which won the class design competition (2<sup>nd</sup> and 3<sup>rd</sup> places) at the design exposition
- Provided guidance on open-ended design projects, which required the integration of multi-disciplinary knowledge in mechanical design

## AWARDS AND FELLOWSHIPS

**Best Presentation in Design and Manufacturing** – October, 2002

The 3<sup>rd</sup> Mechanical Engineering Graduate Student Symposium  
University of Michigan, Ann Arbor, Michigan

**Sloan Summer Fellowship** – May, 1999

University of Michigan and Alfred P. Sloan Foundation

**Top %5 of Class Award** – September, 1995

Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan

## ACTIVITIES AND SERVICE

**UM College of Engineering APPLE Program Certified**, Fall 2004

- Successfully completed the Academic, Personal, Professional and Leadership Education (APPLE) Program

**UM College of Engineering Tech Day 2003, Design Competition Leader**, Fall 2003

- Event held by UM Engineering Council to recruit perspective undergraduate students
- Encouraged teamwork and helped exercise basic engineering concepts/skills through simple design projects and team competitions

**The 4<sup>th</sup> Mechanical Engineering Graduate Student Symposium Committee**, Fall 2003

- Chaired in the Design and Manufacturing Session
- Planned and organized the symposium

**ME Graduate Student Council**, Winter 2003 – Summer 2004

- Planned academic and social events for ME graduate students
- Assisted at the annual recruiting weekend for the University of Michigan Mechanical Engineering Department

**Panelist of “The Forgotten Minority”**, November, 2002

- Event held by Delta Sigma Theta Sorority, Inc., Nu Chapter (Delta Week November 17-23, 2002)
- The panel discussed issues to improve international awareness and involvement

**ASME member**, Fall 1999 – present

- Presented at and attended technical meetings

**Speaker of “HOBY East Michigan Seminar”**, July, 1999

- Event held by Hugh O’Brian Youth Leadership Organization to recognize and develop leadership potential commencing with high school sophomores

## **PUBLICATIONS AND PRESENTATIONS**

**Lu, K.J.** and Kota, S., “Compliant Mechanism Synthesis for Shape-Change Applications: Preliminary Results,” Proceedings of the 2002 SPIE Modeling, Signal Processing, and Control Conference, San Diego, CA, Vol. 4693, pp. 161-172, March, 2002

**Lu, K.J.** and Kota, S., “Design of Compliant Mechanisms for Morphing Structural Shapes,” Journal of Intelligent Material Systems and Structures, Vol. 14, No. 6, pp. 379-391, 2003

**Lu, K.J.** and Kota, S., “Synthesis of Shape Morphing Compliant Mechanisms Using a Load Path Representation Method,” Proceedings of the 2003 SPIE Modeling Signal Processing, and Control Conference, San Diego, CA, Vol. 5049, pp. 337-348, March 2-6, 2003

**Lu, K.J.** and Kota, S., “Parameterization Strategy for Optimization of Shape Morphing Compliant Mechanisms Using Load Path Representation,” ASME 2003 Design Engineering Technical Conferences, Chicago, IL, DETC2003/DAC-48775, September 2-6, 2003

**Lu, K.J.** and Kota, S., “Synthesis of Shape Morphing Compliant Mechanisms Using Load Path Representation,” ASME International Mechanical Engineering Congress & Exposition, Washington, D.C., IMECE2003-41813, November 16-21, 2003

Trease, B.P., **Lu, K.J.**, and Kota S., “Biomimetic Compliant System for Smart Actuator-Driven Aquatic Propulsion: Preliminary Results,” ASME International Mechanical Engineering Congress & Exposition, Washington, D.C., IMECE2003-41446, November 16-21, 2003

**Lu, K.J.** and Kota, S., “An Effective Method of Synthesizing Compliant Adaptive Structures Using Load Path Representation,” accepted by Journal of Intelligent Material Systems and Structures, 2004 (in press)

**Lu, K.J.**, “Design Synthesis of Compliant Mechanisms,” MAE Departmental Seminar Series, George Washington University, Washington, DC, September 23, 2004

**Lu, K.J.** and Kota, S., "Topology and Dimensional Synthesis of Compliant Mechanisms Using Discrete Optimization," submitted to ASME Journal of Mechanical Design, 2005 (in review)