Takeru Igusa
Professor - Johns Hopkins University

Professional Preparation

Harvard University	Applied Mathematics	A.B.,	1977
University of California, Berkeley	Civil Engineering	M.S.,	1979
University of California, Berkeley	Civil Engineering	Ph.D.,	1983
University of California, Berkeley	Civil Engineering – Post Doctoral, part time	1983-86	

Appointments

Associate Director	Systems Institute, Johns Hopkins University	2011-
Professor	Johns Hopkins University	1999-
Visiting Professor	Tokyo Institute of Technology	2005
Summer Faculty	Sandia National Laboratories	Summer 2003
Professor	Northwestern University	1996-1999
Associate Professor	Northwestern University	1990-1996
Assistant Professor	Northwestern University	1986-1990
Engineer, Senior Engineer	John A. Blume and Associates	1979-1983

Products

(i) 5 most closely related to the proposal

Dugas AF, Jalalpour M, Gel Y, Levin S, Torcaso F, Igusa T, Rothman R. Influenza Forecasting with Google Flu Trends. PLOS ONE. In Press.

Jalalpour, M., Igusa, T., Guest, J.K. (2011) "Optimal design of trusses with geometric imperfections: Accounting for global instability," *International Journal of Solids and Structures*, 48:3011-3019.

Fritz, W.P., N.P. Jones and T. Igusa. (2009). "Predictive models for the median and variability of building period and damping". *Journal of Structural Engineering*, 135:576-586.

Guest, J.K. and T. Igusa. (2008). "Structural optimization under uncertain loads and nodal locations," *Computer Methods in Applied Mechanics and Engineering* 198:116-124.

Liu, H. and T. Igusa. (2007). "Feature-based classification for design optimization," *Research in Engineering Design* 17:189-206.

(ii) 5 other significant products

Kermani, A., Khakpour, H.R., Shen, L., Igusa, T. (2011). "Statistics of surface renewal of passive scalars in free-surface turbulence," *Journal of Fluid Mechanics*, 678: 379-416.

Louhghalam, A., Igusa, T., Park, C., Choi, S., Kim, K. (2011). "Analysis of stress concentrations in plates with rectangular openings by a combined conformal mapping - Finite element approach," *International Journal of Solids and Structures*, 48:1991-2004.

Fritz, W.P., T. Igusa and N.P. Jones. (2009). "Predictive models from statistically non-conforming databases," *Journal of Stuctural Engineering* 135: 567-575.

Moen, C.D., T. Igusa and B.W. Schafer. (2008). "Prediction of residual stresses and strains in cold-formed steel members," *Thin-Walled Structures* 46:1274-1289.

Liu, H., S.R. Arwade and T. Igusa. (2007). "Random composites characterization and damage estimation using Bayesian classifiers," *Journal of Engineering Mechanics* 133:129-140.

Synergistic Activities

Integration of knowledge: establishment of the Johns Hopkins Systems Institute. Currently engaged in a spectrum of systems science activities, ranging from course development to the formation of transdisciplinary teams to engage in research on systems approaches to Grand Challenges. This led to the establishment in April 2011 of the Systems Institute that spans the Schools of Engineering, Medicine, Public Health and Education as well as the Johns Hopkins Applied Physics Laboratory (APL). Igusa has been successful in working with the Dean of Engineering in securing seed funding from these Schools and APL.

Transdisciplinary approaches to systems modeling research and education: Director of the Education and Training Core of the Johns Hopkins Global Center for Childhood Obesity Research. This is an NIH Center of Excellence with a mission to explore "systems modeling to capture the complexity of the etiology of childhood obesity and the potential impact of environmental and/or policy interventions." Responsible for overall management, training and recruitment of students and visiting scholars in systems applications to public health, and development and oversight of a transdisciplinary dual mentorship program.

Development of research tools: topology optimization under uncertainty. Currently working with Jamie Guest to develop a mathematical approach for topology optimization under uncertainty. The algorithms tightly couple optimization and uncertainty analysis, resulting in a highly efficient approach that outperforms current loosely coupled methods.

Development of computational methodologies. Implementation of the theoretical work on the stochastic response of secondary systems to dynamic loads which includes the effects of non-classical damping, into a commercial-grade software package, *FSG* (*Floor Spectra Generator*), which is in use by engineering firms such as: *Alstom Power*, Belfort, France, *Bechtel Power Corp.*, San Francisco, California, *Electricité de France*, Clamart, France, *Hitachi Corporation*, *Mitsubishi Heavy Industries*, and *Toshiba Corporation*, Tokyo, Japan.

Service to the engineering community. Editorial Board, Structural Safety (2008-). Associate Editor, Journal of Structural Engineering, (1998-2003).

Collaborators & Other Affiliations

(i) Collaborators and Co-Editors

Prof. Sanjay R. Arwade, *University of Massachusetts;* Dr. Seth Guikema, Prof. Gregory Chirikjian, Dr. Andreas Terzis, Dr. Rene Vidal, Dr. Judith Mitrani-Reiser, Prof. Benjamin Schafer, Dr. James Guest, Prof. Robert Dalrymple, Prof. Darryn Waugh, Prof. Gregory Hager, Prof. Russell Taylor, Dr. Peter Kazanzides, Prof. Rao Kosaraju, Prof. Pablo Iglesias, *Johns Hopkins University;* Prof. Antony Rosen M.D., Prof. Peter Pronovost M.D., Prof. Joshua Epstein, Dr. Scott Levin, Dr. Adam Sapirstein M.D., *Johns Hopkins School of Medicine;* Dr. Youfa Wang, Dr. Harold Lehman M.D., Prof. Jonathan Weiner, Prof. Thomas Glass, Prof. Brian Schwartz, Prof. Jon Links, *Johns Hopkins School of Public Health;* Dr. Mohammad Dehghani, *Johns Hopkins Applied Physics Laboratory*; Mazdak Tootkaboni, *University of Massachusetts Dartmouth;* Dr. Cris Moen, *Virginia Polytechnic Institute;* Dr. Ross Hammond, *The Brookings Institution;* Dr. Erin Hennessy, *National Cancer Institute, NIH;* Dr. Ginny Chomitz, *Tufts University School of Medicine;* Dr. Christina Economos, *Tufts University*

(ii) Graduate and Postdoctoral Advisors:

Armen Der Kiureghian, Professor, University of California at Berkeley

(iii) Thesis Advisor and Postgraduate –Scholar Sponsor

(*career total*: *21 PhD, 11 MS, 7 Postdoctoral scholars*)

LAST 5 YEARS: Libin Tan (with S.R. Arwade), PhD, 6/08; Arghavan Louhghalam, PhD, 12/09; Ju-Mee Ryoo (with D.W. Waugh), 12/09; Mehdi Jalalpour, PhD, 6/2013