



# American Academy of Mechanics

## 2017 AAM Fellow Nomination

Kaliat Ramesh

**Citation:** For pioneering contributions to our understanding of dynamic behavior of materials and nanomaterials.

**First Nominator:** Guruswami (Ravi) Ravichandran

**Email:** [ravi@caltech.edu](mailto:ravi@caltech.edu)

**Signature:**

**Second Nominator:** Horacio Espinosa

**Email:** [espinosa@northwestern.edu](mailto:espinosa@northwestern.edu)

**Confirm:** Yes

**Signature:**

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## K. T. Ramesh

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### EDUCATION

B.E.	Mechanical Engineering	Bangalore University	1982
Sc. M.	Solid Mechanics	Brown University	1985
Sc. M.	Applied Mathematics	Brown University	1987
Ph.D.	Solid Mechanics	Brown University	1988
Postdoc	Mechanics of Materials	University of California, San Diego	1987-88

### EXPERIENCE

Director	Hopkins Extreme Materials Institute	Since 2012
Director	Center for Materials in Extreme Dynamic Environments, JHU	Since 2012
Department Chair	Mechanical Engineering, Johns Hopkins University	1999 – 2002
Professor	Mechanical Engineering, Johns Hopkins University	Since 1997
Professor (Joint Appt.)	Earth & Planetary Sciences, Johns Hopkins University	Since 2015
Professor (Secondary Appt.)	Materials Science & Engineering, Johns Hopkins University	Since 1997
Principal Professional Staff	Johns Hopkins Applied Physics Laboratory (APL)	Since 2011
Visiting Scientist	Planetary Geodynamics Group, NASA Goddard Space Flight Center	Fall 2011
Visitor	Cavendish Lab., Univ. Cambridge, UK	2002 – 2003
Visitor	Engineering, Univ. Cambridge, UK	2002 – 2003
Associate Professor	Mechanical Engineering, Johns Hopkins University	1993 – 1997
Assistant Professor	Mechanical Engineering, Johns Hopkins University	1988 – 1993

### HONORS AND AWARDS

W.M. Murray Medal	Society for Experimental Mechanics	2015
M.G. McLaren Lecture Award	Rutgers University	2014
Glass Memorial Lecturer	University of Toronto	2013
Midwest Mechanics Lecturer	Ten Midwestern Universities	2012-2013
Fellow	Society for Experimental Mechanics	2013
B.J. Lazan Award	Society for Experimental Mechanics	2012
M. Hetenyi Award	Society for Experimental Mechanics	2006
Southwest Mechanics Lecturer	Texas A&M, UTA, SMU, Tulane	2002
Fellow	American Soc. Mechanical Engineers	2001
W.H. Huggins Award for Excellence in Teaching	Johns Hopkins University	1995
Best Paper	ASME Tribology Division	1987

### SELECTED JOURNAL PUBLICATIONS

1. Chichili, D.R., Ramesh, K.T. & Hemker, K.J., "The High-Strain-Rate Response of Alpha-Titanium: Experiments, Deformation Mechanisms, and Modeling," *Acta Materialia*, Vol. 46, No. 3, pp. 1025-1043, 1998.
2. Xing, L.-Q., Li, Y., Ramesh, K.T., Li, J. & Hufnagel, T.C., "Enhanced plastic strain in Zr-based bulk amorphous alloys," *Physical Review B*, Vol. 64 (18): Article No. 180201, 2001.
3. Jia, D., Ramesh, K.T. and Ma, E., "Effects of Nanocrystalline and Ultrafine Grain Sizes on Constitutive Behavior and Shear Bands in Iron," *Acta Materialia*, vol. 51, No. 12, pp. 3495-3509, 2003.
4. Jia, D. & Ramesh, K.T., "A Rigorous Assessment of the Benefits of Miniaturization in the Kolsky Bar System," *Experimental Mechanics*, Vol. 44, No. 5, pp. 445-454, 2004.
5. S.P. Joshi and K.T. Ramesh, "Rotational Diffusion and Grain-Size Dependent Shear Instability in Nanostructured Materials," *Acta materialia*, Vol. 56, pp. 282–291, Jan. 2008.
6. B. Paliwal & K.T. Ramesh, "An interacting micro-crack damage model for failure of brittle materials under compression," *Journal of the Mechanics and Physics of Solids*, 56, pp. 896–923, Mar. 2008.
7. S.P. Joshi & K.T. Ramesh, "Stability Map for Nanocrystalline and Amorphous Materials," *Physical Review*

- Letters, Vol. 101, No. 2, Art. No. 025501, Jul. 2008.
8. J. Kimberley, N. Daphalapurkar & K. T. Ramesh, "A scaling law for the dynamic strength of brittle solids," *Acta Materialia*, Vol. 61, No. 9, pp. 3509-3521, 2013.
  9. M. Delbo, G. Libourel, J. Wilkerson, N. Murdoch, P. Michel, K. T. Ramesh, C. Ganino, C. Verati & S. Marchi, "Regolith formation on small asteroids by thermal fragmentation," *Nature*, Vol. 508, no. 7495, pp. 233-238, 2014.
  10. K.T. Ramesh, James D. Hogan, Jamie Kimberley, & Angela Stickle, "A Review of Mechanisms and Models for Dynamic Failure, Strength, and Fragmentation," *Planetary and Space Sciences*, Vol. 107, pp. 10-23, 2015.
  11. G. Hu, Liu, J., Graham-Brady, L., & K.T. Ramesh, "A 3D Mechanistic Constitutive Model for Brittle Materials Containing Evolving Flaw Distributions under Dynamic Multiaxial Loading," *Journal of the Mechanics and Physics of Solids*, Vol. 78, pp. 269-297, 2015.
  12. A.L. Tonge & K.T. Ramesh, "Multi-scale defect interactions in high-rate brittle material failure. Part I: Model formulation and application to AlON," *Jnl. of the Mechanics and Physics of Solids*, Vol. 86, pp. 117-149, 2016.
  13. A.L. Tonge, K.T. Ramesh & O. Barnouin, "A Model for Impact-Induced Lineament Formation and Porosity Growth on Eros," *Icarus*, Vol. 266, pp. 76-87, 2016.
  14. J.W. Wilkerson and K.T. Ramesh, "Unraveling the anomalous grain size dependence of cavitation," *Physical Review Letters*, 117, 215503, 2016.
  15. S. Ganpule, N.P. Daphalapurkar, K.T. Ramesh, A.K. Knutsen, D.L. Pham, P.V. Bayly, and J.L. Prince, "A 3D Computational Human Head Model that Captures Live Human Brain Dynamics," *Journal of Neurotrauma*, Vol. 34, No. 13, pp. 2154-2166, 2017.

## BOOKS

- *Nanomaterials: Mechanics and Mechanisms*, Springer, 2009.
- *Experimental Techniques in the Dynamics of Deformable Solids*, ed. Ramesh, K.T., AMD Vol. 165, ASME, New York, 1993.

## PRESENTATIONS

About 150 Invited Seminars, Plenary Lectures and Keynote Lectures. Over 450 conference presentations.

## TEACHING AND MENTORSHIP

Supervised 35 postdoctoral fellows; 39 current or former Ph.D. students (in the past, 11 went to academia, 9 to industry, 6 to national labs); 23 Master's degrees awarded for research in the Ramesh lab; and more than 85 undergraduate research assistants.

## PROFESSIONAL SOCIETIES

Member of American Academy of Mechanics, ASME, SEM, SES, AAAS, TMS, MRS, ACerS, ASEE, APS, Geological Society of America, AGU, and American Astronomical Society.

## SELECTED PROFESSIONAL SERVICE

Former Director (Region I), American Academy of Mechanics; President, Society of Engineering Science; Editorial Boards of multiple journals, in mechanics, materials and neurology; Board of Directors, Society for Experimental Mechanics; Committees in ASME and various societies.

## SUMMARY

He is strongly engaged in all aspects of applied mechanics and mechanical engineering, with a clear emphasis on the coupling of fundamental research and pedagogy to advance the field. He manages a very large research activity, grounded in mechanics but cutting across materials science, planetary science and biomechanics. He is also an academic leader, running the Department of Mechanical Engineering at Johns Hopkins University and establishing two Centers as well as the Hopkins Extreme Materials Institute. In the broader community, he has been very active in ASME, SEM, SES, TMS, and AAM.