

**BIOGRAPHICAL SKETCH AND PROFESSIONAL ACTIVITIES
RENSSELAER POLYTECHNIC INSTITUTE**

Name Nikhil Koratkar
Department Mechanical, Aerospace and Nuclear Engineering
School Engineering
Current Rank Professor

2009 – Present: Professor, Department of Mechanical, Aerospace and Nuclear Engineering
 2005 – 2008: Associate Professor, Department of Mechanical, Aerospace and Nuclear Engineering
 2001 – 2005: Assistant Professor, Department of Mechanical, Aerospace, and Nuclear Engineering

I. Educational Preparation

B. Tech, Aerospace Engineering, Indian Institute of Technology, Bombay, India, 1995
 M.S., Aerospace Engineering, University of Maryland, College Park, 1998
 Ph.D., Aerospace Engineering, University of Maryland, College Park, 2000

II. Professional Experience:

2009-Present Professor, Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, New York.
 2005-2008 Associate Professor, Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, New York.
 2001-2005 Assistant Professor, Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, New York.

III. Teaching

A. Courses

Term	Number	Course Title	# Students	IDEA Ratings (out of 5.0)	
				Course	Instructor
Fall 08	MANE 4200	Rotorcraft Performance, Stability and Control	15	4.9	4.9
Spring 08	MANE 4920	Aerospace Structures and Controls Lab	70	4.2	4.2
Spring 08	MANE 4860	Introduction to Helicopter Design	20	4.4	4.4
Fall 07	MANE 4200	Rotorcraft Performance, Stability and Control	20	4.3	4.5
Spring 07	MANE 4920	Aerospace Structures and Controls Lab	65	4.1	3.7
Spring 07	MANE 4860	Introduction to Helicopter Design	13	4.6	4.6
Fall 06	MANE 4200	Rotorcraft Performance, Stability and Control	18	4.6	4.5
Spring 06	MANE 4920	Aerospace Structures and Controls Lab	62	4.4	4.5
Spring 05	MANE 4920	Aerospace Structures and Controls Lab	24	4.5	4.5
Spring 05	MANE 4860	Introduction to Helicopter Design	17	4.7	4.7
Fall 04	MANE 4200	Rotorcraft Performance, Stability and Control	10	5.0	5.0
Fall 04	MANE 6060	Rotorcraft Performance, Stability and Control	1	5.0	5.0

Spring 04	MANE 4920	Aerospace Structures and Controls Lab	32	3.9	4.1
Fall 03	MANE 4200	Rotorcraft Performance, Stability and Control	5	5.0	5.0
Fall 03	MANE 6060	Rotorcraft Performance, Stability and Control	2		
Spring 03	MANE 4920	Aerospace Structures and Controls Lab	30	3.5	3.7
Spring 03	MANE 4860	Introduction to Helicopter Design	8	5.0	4.9
Fall 02	MANE 4200	Rotorcraft Performance, Stability and Control	5	5.0	4.8
Fall 02	MANE 6060	Rotorcraft Performance, Stability and Control	1	4.0	4.0
Spring 02	MANE 4920	Aerospace Structures and Controls Lab	16	3.3	3.2
Spring 02	MANE 4230	Fixed Wing Aircraft Design	15	3.0	2.8
Fall 01	MANE 4200	Rotorcraft Performance, Stability and Control	4	4.0	4.0
Fall 01	MANE 6060	Rotorcraft Performance, Stability and Control	1		
Spring 01	MANE 4920	Aerospace Structures and Controls Lab	14	2.9	3.0

B. Student Thesis Supervision

1. Thesis In Progress

Five graduate students (4 Ph.D. and 1 M.S.) are working with Koratkar as advisor

- (1) Keyan Raiffee, "Fracture and Fatigue in Graphene/Polymer composites", Started August (2009).
- (2) Rahul Krishnan, "Nanocompliant silicon anodes for high performance Li-ion batteries", Started August (2008).
- (3) Velibor Peric, "Fatigue suppression in nano-composite materials", Started June (2008).
- (4) Iti Srivastava, "Gas and liquid chromatography using carbon nanotube membranes", Started December (2007).
- (5) Ranganath Teki, "Nanostructured electrode arrays for efficient energy conversion", Started May (2005).

2. Thesis Completed

a. Masters (Graduated 5 Masters Students)

- (1) Andrew Proper, (2008), "Hierarchical carbon nanotube composites"
- (2) Jeremy Nelson, (2004), "Flow control strategies for improvement of micro-air-vehicle performance"
- (3) Sameer Kulkarni, (2004), "Applications of carbon nanotubes in sensing"
- (4) Eric Lass, (2003) "Effect of temperature on the resistivity of aligned multi-walled carbon nanotube films"
- (5) Ashish Modi, (2003) "Miniaturized gas ionization sensors using carbon nanotubes"

b. Doctoral (Graduated 6 Ph.D. Students)

- (1) Wei Zhang, (2008) “Advanced multifunctional composites featuring carbon nanotube additives”. Wei has joined GE global research in Niskayuna, NY.
- (2) Zuankai Wang (2008), “Understanding and controlling wetting phenomena at the micro/nano scale”, Zuankai is a post-doctoral researcher at Columbia University.
- (3) Seongyul Kim (2008) , “Fundamental study of field-induced gas and water dissociation near nanostructured electrodes”, Kim works for Samsung in Korea
- (4) Li Chen, (2008) “Field induced adsorption/desorption of gas species to the surfaces of carbon nanotubes”. Li has accepted a teaching position at Bridgewater State College
- (5) Jonghwan Suhr, (2005) “Energy dissipation mechanisms in carbon nanotube polymer composites”. Jonghwan is a tenure track **assistant professor** of mechanical engineering at the University of Nevada at Reno.
- (6) Jongmin Kim, (2004) “Flow control strategies for improved aerodynamic efficiency of micro-rotorcraft”. Jongmin works for Samsung in Korea.

3. Doctoral Thesis Committee Member

- | | |
|------------------------|---------------------------------|
| (1) Hyungdae Lee | (Advisor: Dr. C. James Li) |
| (2) Shin Hyeongceol | (Advisor: Dr. C. James Li) |
| (3) Stanley Orr | (Advisor: Dr. P. Hajela) |
| (4) Varun Sakalkar | (Advisor: Dr. P. Hajela) |
| (5) Anoop Mullur | (Advisor: Dr A. Messac) |
| (6) Ritesh Khire | (Advisor: Dr. A. Messac) |
| (7) Su Zhao | (Advisor: Dr. L. Schadler) |
| (8) Renee Duncan | (Advisor: Dr. L. Schadler) |
| (9) Amit Joshi | (Advisor: Dr. R. Kane) |
| (10) Sumanjit Kaur | (Advisor: Dr. R. Kane) |
| (11) Sandeep Razdan | (Advisor: Dr. P. Ajayan) |
| (12) Claudiu Hapenciuc | (Advisor: Dr. T. Borca-Tasciuc) |
| (13) Sunil Pal | (Advisor: Dr. T. Borca-Tasciuc) |
| (14) Tom Parker | (Advisor: Dr. Toh-Ming Lu) |
| (15) Sashi Kandanur | (Advisor: Dr. T. Blanchet) |
| (16) Limeng Chen | (Advisor: Dr. R. Ozisik) |

4. Post doctoral students

- (1) Jonghwan Suhr, “Nanoscale ionization detector for bio-sensing”, September (2005) to May (2006).
- (2) Juntaek Ryoo, “Modeling the mechanical properties of singlewalled carbon nanotubes using cellular automata”, January (2002) to May (2003).

III. Teaching

C. Course and Curriculum Development

MANE 4920 – Aerospace Structures and Controls Lab: Offered Spring 2001-2008.

A new lab was developed by Koratkar in spring 2001. The primary emphasis of the lab was on experiments related to lightweight structures, structural dynamics, and control as it applies to

aircraft, spacecraft and rotorcraft. Experiments include tensile testing of aerospace materials, elastic instability investigations of columns, bending and torsion response of thin walled box-beams and structural vibrations of cantilevered Euler-Bernoulli beams.

MANE 4200 – Rotorcraft Performance Stability & Control: Offered Fall 2001-2009

MANE 6060 – Rotorcraft Performance Stability & Control: Offered Fall 2001-2009

The existing course content was upgraded with new materials. These included advanced topics such as: unsteady aerodynamics and dynamic stall, rotor wake structure modeling and rotorcraft vibration and acoustics. Student “seminars” were also incorporated into the curriculum to enhance student participation and involvement in the learning process.

To bridge the gap between theory and hands-on experience and provide students with greater confidence in the capabilities as well as the limitations of conventional modeling and design tools a “laboratory experiment” was added to the curriculum. The students were asked to test a micro-rotor system at different rotor speeds and blade collective pitch settings. Both conventional untwisted, rectangular planform blades as well as advanced geometry rotor blades were tested. The rotor thrust, induced power, profile power and figure of merit were experimentally measured and compared with the predictions of blade-element momentum theory in hover. The experiments served to highlight the rationale behind several key design choices that are central to helicopter main rotor design: such as choice of number of blades, airfoil section, blade radius, aspect ratio, operating RPM, solidity, disk loading, as well as the optimal blade twist/taper distributions.

MANE 4860 – Introduction to Helicopter Design: Offered Spring 02, 03, 05, 07 and 08.

The helicopter design class provides a system level capstone design experience for students specializing in vertical flight technology. As instructor for capstone design, Koratkar has served as faculty advisor to a series of RPI student design teams that have competed in the annual AHS/Industry/NASA helicopter design competition. In spring 2002 semester, four aerospace engineering seniors (Nate Gray, Sam Butler, Jason Anger and Joseph Gillman) taking this class competed in and won **1st place** in the 19th Annual AHS/Industry/NASA student design condition in the undergraduate category. In 2003, an 8-member RPI team again participated in this competition and won **2nd place** in the undergraduate category. In 2005, as part of MANE 4860 Koratkar advised two separate 5-member RPI teams (Wyver and Titan) that participated in the AHS design contest. Both RPI teams excelled in the competition. The Wyver team (Raisul Haque, Rafael Irizarry, Heather Maffei, Robin Chin and Trevor Tersmette) won **1st place** (undergraduate category) while the Titan team came in third.

D. Education and Outreach

Koratkar has served as Principal Investigator on a *National Science Foundation sponsored Nanoscale Undergraduate Education project*. This project was initiated in the Fall of 2003 and aims to introduce undergraduate students to nanoscale science and technology. Under this project, Koratkar has developed a series of interactive learning modules (or virtual labs) that allows students to construct simple devices using carbon nanotube electrodes and apply these devices for mechanical and chemical sensing.

These virtual labs offer a multimedia-based dynamic tutorial unit that provides the background necessary to understand the key concepts along with an interactive simulation that gives the student an opportunity to set-up, perform, observe/monitor and control experiments and operations. The virtual labs were developed in collaboration with Dr. Don Millard (Director, Academy of Electronic Media) and were integrated into MANE 4920 (aerospace structures and controls lab) and one section of ENGR 1600 (chemistry of materials).

At the completion of the Spring 2004 semester, the students were provided an evaluation form and asked to self-assess the impact of the new learning/educational materials. A total of 31 students taking MANE 4920 (structures and controls Lab) and 25 students taking ENGR 1600

(chemistry of materials) responded to the survey. The results of the survey were encouraging; *an overwhelming 90.32% of the respondents for MANE 4920 felt that the nanotechnology module had a positive impact on learning and should be retained as part of the course. Similarly 80% of the respondents for ENGR 1600 felt that the new nanotechnology learning materials had a positive impact on learning.*

Koratkar is disseminating the interactive modules developed in the NSF project to high school students in collaboration with Ms. Tammie Borland, a teacher with the New Visions program. Every year Koratkar gives a detailed presentation of the interactive modules to New Visions students at the invitation of Ms. Borland.

IV. Publications

A. Books, Monographs, Chapters in Books

- (1) J. Suhr and **N. Koratkar**, “Mechanical Damping in Nanocomposites”, Book Chapter, accepted for publication, to appear in *Encyclopedia of Nanoscience & Nanotechnology*, Edited by Dr. H.S. Nalwa, American Scientific Publishers, CA (2009).
- (2) Z. Wang and **N. Koratkar**, “Understanding and controlling wetting phenomena at the micro and nanoscales”, Book Chapter, accepted for publication, to appear in *Nanostructured Films, Surfaces and Coatings for Life Sciences.*, Edited by Dr. C. Kumar, Wiley-VCH, Germany (2009).

B. Journal Articles

a. Refereed Journal Articles

Koratkar is the corresponding author on the Papers listed below except for Papers 1, 3, 6, 19, 23, 33 and 46.

- (1) Y.-F. Zhu, C. Ma, W. Zhang, R.-P. Zhang, **N. Koratkar** and J. Liang, “Alignment of Multiwalled Carbon Nanotubes in Bulk Epoxy Composites via Electric Field”, accepted for publication in the *Journal of Applied Physics*, in-press (2009).
- (2) W. Zhang, I. Srivastava, Y.-F. Zhu, C. R. Picu and **N. Koratkar**, “Heterogeneity in Epoxy Nanocomposites Initiates Crazing: Significant Improvements in Fatigue Resistance and Toughening”, *Small*, accepted for publication, in-press (2009).
[2007 ISI impact factor for Small is 6.408]
- (3) M. Gasda, R. Teki, T.-M. Lu, **N. Koratkar**, G. Eisman, D. Gall, “Sputter-deposited Pt PEM fuel cell electrodes: particles vs. layers”, *Journal of The Electrochemical Society*, accepted for publication, in-press (2009).
- (4) J. P. Singh, R. Teki, L. Ci, P. Ajayan and **N. Koratkar**, “Detecting mechanical resonance in carbon nanotubes via inter-tube electrical transport measurements”, *Journal of Nanoscience and Nanotechnology* 8, 436-438 (2008).
- (5) C. Li, Z. Wang, P.-I. Wang, Y. Peles, **N. Koratkar** and G. P. Peterson, “Nanostructured copper interfaces for enhanced boiling”, *Small* 4, 1084-1088 (2008).
[2007 ISI impact factor for Small is 6.408]
This work was featured by Nature (doi:10.1038/news.2008.935), July 4, 2008.

- (6) C. Ma, L.J. Ji, R.P. Zhang, Y.F. Zhu, W. Zhang and **N. Koratkar**, “In-situ alignment and dispersion of functionalized carbon nanotubes in polymer composites by AC electric field”, *Carbon* 46, 706-710 (2008).
- (7) S. Kim, S. Pal, P. Ajayan, T. Borca-Tasciuc and **N. Koratkar**, “Electrical breakdown gas detector featuring carbon nanotube array electrodes”, *Journal of Nanoscience and Nanotechnology* 8, 416-419 (2008).
- (8) W. Zhang, R.C. Picu and **N. Koratkar**, “Effect of carbon nanotube dimensions and dispersion on the fatigue behavior of epoxy nanocomposites” *Nanotechnology*, 19, 285709 (2008).
- (9) A. Proper, W. Zhang, S. Bartolucci, A. Oberai and **N. Koratkar**, “In situ detection of impact damage in composites using carbon nanotube sensor networks”, accepted for publication in *Nanoscience and Nanotechnology Letters*, in-press (2008).
- (10) J. Suhr and **N. Koratkar**, “Energy dissipation in carbon nanotube composites- A review”, *Journal of Materials Science*, 43, 4370-4382 (2008).
- (11) R. Teki, T. C. Parker, H. Li, **N. Koratkar**, T.-M. Lu, and S. Li, “Low temperature synthesis of single crystalline ZnO nanorods by oblique angle deposition”, *Thin Solid Films*, 516, 4993–4996 (2008).
- (12) R. Teki, T.-M. Lu, and **N. Koratkar**, “Effect of tip geometry on photo-electron-emission from nanostructures”, *Journal of Nanoscience and Nanotechnology*, in-press (2008).
- (13) Z. Wang and **N. Koratkar**, “Electrically controlled wetting and dewetting transition on silicon micro-pillar arrays”, *Advanced Science Letters*, in-press (2008).
- (14) Z. Wang, L. Ci, L. Chen, S. Nayak, P. Ajayan and **N. Koratkar**, “Polarity-dependent electrochemically controlled transport of water through carbon nanotube membranes”, *Nano Letters* 7, 697-702 (2007).
[This paper was featured on American Chemical Society (ACS) website as a "**Hot Paper**" as defined by Thomson Scientific (ISI) Essential Science Indicators. Hot Papers are articles published within the last two years receiving the most citations over the most recent two-month period.
[2007 ISI impact factor for Nano Letters is 9.627]
- (15) W. Zhang, V. Sakalkar, and **N. Koratkar**, “In situ health monitoring and repair in composites using carbon nanotube additives”, *Applied Physics Letters* 91, 133102 (2007).
[This paper was featured in the *Virtual Journal of Nanoscale Science & Technology*. The Virtual Journal, published by American Institute of Physics and the American Physical Society in cooperation with numerous other societies and publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research]
- (16) Z. Wang, C. Lopez, A. Hirska and **N. Koratkar**, “Impact dynamics and rebound of water droplets on superhydrophobic carbon nanotube arrays”, *Applied Physics Letters* 91, 023105 (2007).

- (17) Z. Wang, Y. Ou, T.-M. Lu and **N. Koratkar**, “Wetting and electrowetting properties of carbon nanotube templated parylene films”, *Journal of Physical Chemistry B* 111, 4296-4299 (2007).
- (18) Z. Wang, L. Ci, P. Ajayan and **N. Koratkar**, “Combined micro/nanoscale surface roughness for enhanced hydrophobic stability in carbon nanotube arrays”, *Applied Physics Letters* 90, 143117 (2007).
[This paper was featured in the *Virtual Journal of Nanoscale Science & Technology*. The Virtual Journal, published by American Institute of Physics and the American Physical Society in cooperation with numerous other societies and publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research]
- (19) L. Chen, Y. Zhang, **N. Koratkar**, P. Jena, and S. K. Nayak, “First principles study of interaction of molecular hydrogen with Li doped carbon nano peapod”, *Physical Review B*, 77, 033405 (2007).
- (20) W. Zhang, R. C. Picu and **N. Koratkar**, “Suppression of fatigue crack growth in carbon nanotube composites”, *Applied Physics Letters*, 91, 193109 (2007).
[This paper was featured in the *Virtual Journal of Nanoscale Science & Technology*. The Virtual Journal, published by American Institute of Physics and the American Physical Society in cooperation with numerous other societies and publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research]
- (21) Z. Wang, A. Joshi, R. Kane and **N. Koratkar**, “Creep mitigation in composites using carbon nanotube additives”, *Nanotechnology* 18, 185703 (2007).
- (22) J. Suhr, A. Joshi, L. Schadler, R. Kane and **N. Koratkar**, “Effect of filler geometry on interfacial friction damping in polymer nano-composites”, *Journal of Nanoscience and Nanotechnology* 7, 1684-1687 (2007).
- (23) J. Ryoo, P. Hajela, J. Suhr and **N. Koratkar**, “Estimation of Young’s modulus of singlewalled carbon nanotubes using cellular automata”, *Advances in Engineering Software* 38, 531-537 (2007).
- (24) W. Zhang, J. Suhr and **N. Koratkar**, “Observation of high buckling stability in carbon nanotube polymer composites”, *Advanced Materials* 18, 452-456 (2006).
[2007 ISI impact factor for Advanced Materials is 8.191].
- (25) R. Teki, **N. Koratkar**, T. Karabacak and T.-M. Lu, “Enhanced photo-emission from nanostructured surface topologies”, *Applied Physics Letters* 89, 193116 (2006).
- (26) S. Kim, T. Karabacak, T.-M. Lu and **N. Koratkar**, “Water Electrolysis Activated by Ru Nanorod Array Electrodes”, *Applied Physics Letters* 88, 263106 (2006).
[This paper was featured in the *Virtual Journal of Nanoscale Science & Technology*. The Virtual Journal, published by American Institute of Physics and the American Physical Society in cooperation with numerous other societies and publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research]

- (27) J. Suhr, W. Zhang, P. Ajayan and **N. Koratkar**, “Temperature activated interfacial friction damping in carbon nanotube polymer composites”, *Nano Letters* 6, 219-223 (2006).
[2007 ISI impact factor for Nano Letters is 9.627]
- (28) Z. Wang and **N. Koratkar**, “Suppressing electrostatic screening in nanostructured electrode arrays”, *Journal of Nanoscience and Nanotechnology* 6, 1979-1984 (2006).
- (29) W. Zhang, J. Suhr and **N. Koratkar**, “Carbon nanotube/polycarbonate composites as multifunctional strain sensors”, *Journal of Nanoscience and Nanotechnology* 6, 960-964 (2006).
- (30) J. Suhr and **N. Koratkar**, “Effect of pre-strain on interfacial friction damping in carbon nanotube polymer composites”, *Journal of Nanoscience and Nanotechnology* 6, 483-486 (2006).
- (31) D.-B. Cho, J. Suhr and **N. Koratkar**, “Carbon nanotube thin film coating for improved thermal management in piezoceramic sheet actuators”, *Intelligent Materials Systems and Structures* 17, 209-216 (2006).
- (32) J. Suhr, **N. Koratkar**, D.-X. Ye and T.-M. Lu, “Damping properties of epoxy films with nanoscale fillers”, *Intelligent Materials Systems and Structures* 17, 255-260 (2006).
- (33) P. Ajayan, J. Suhr and **N. Koratkar**, “Utilizing interfaces in carbon nanotube reinforced polymer composites for structural damping”, *Journal of Materials Science* 41, 7824-7829 (2006).
- (34) **N. Koratkar**, “Nanoscale field ionization sensors- a review”, *International Journal of Nanoscience* 4, 945-949 (2005).
- (35) J. Suhr, **N. Koratkar**, P. Keblinski and P. Ajayan, “Viscoelasticity in carbon nanotube composites,” Nature Materials 4, 134-137, (2005). Paper cited 52 times.
[Nature Materials is ranked #1 for Materials Science; 2007 ISI impact factor is 19.78]
- (36) **N. Koratkar**, J. Suhr, A. Joshi, R. Kane, L. Schadler, P. Ajayan, and S. Bartolucci, “Characterizing energy dissipation in single-walled carbon nanotube polycarbonate composites”, *Applied Physics Letters* 87, 063102 (2005).
[This paper was featured in the *Virtual Journal of Nanoscale Science & Technology*. The Virtual Journal, published by American Institute of Physics and the American Physical Society in cooperation with numerous other publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research]
- (37) J. Kim and **N. Koratkar**, “Feasibility study to develop a Mach-scaled swashplateless rotor model,” *Smart Materials and Structures* 14, 79-86 (2005).
- (38) J. Kim and **N. Koratkar**, “Effect of unsteady blade pitching motion on aerodynamic performance of micro-rotorcraft,” *Journal of Aircraft*, 42, 874-881 (2005).
- (39) J. Nelson and **N. Koratkar**, “Eng. Note: Effect of miniaturized Gurney flaps on aerodynamic performance of micro-scale rotors,” *Journal of Aircraft* 42, 557-561 (2005).
- (40) J. P. Singh, **N. Koratkar**, T. Karabacak, T.-M. Lu and G.-C. Wang, “Field ionization of argon using β -phase W nanorods,” *Applied Physics Letters* 85, 3226-3228 (2004).

- (41) **N. Koratkar**, A. Modi, J. Kim, B. Wei, R. Vajtai, S. Talapatra and P. Ajayan, "Mobility of carbon nanotubes in high electric fields," *Journal of Nanoscience and Nanotechnology* 4, 69-71, (2004).
- (42) **N. Koratkar**, A. Modi, E. Lass, and P. Ajayan, "Temperature effects on resistance of aligned multi-walled carbon nanotube films," *Journal of Nanoscience and Nanotechnology* 4, 744-748 (2004).
- (43) **N. Koratkar**, B. Wei and P. Ajayan, "Multifunctional structural reinforcement featuring carbon nanotube films", *Composites Science and Technology* 63, 1525-1531, (2003).
- (44) W. Zhang, J. Kim and **N. Koratkar**, "Energy-absorbent composites featuring embedded shape memory alloys" *Smart Materials and Structures* 12, 642-646 (2003).
- (45) A. Modi, **N. Koratkar**, E. Lass, B. Wei and P. Ajayan, "Miniaturized gas ionization sensors using carbon nanotubes", *Nature* 424, 171-174, (2003). **Paper cited 179 times.**
[**Nature is the ranked #1 in the area of multidisciplinary science; 2007 ISI impact factor is 28.751**]
- (46) J. Kim, Z. Rusak, and **N. Koratkar**, "Small-scale airfoil aerodynamic efficiency improvement by surface temperature and heat transfer" *AIAA Journal* 41, 2105-2113, (2003).
- (47) **N. Koratkar**, B. Wei, and P. Ajayan, "Carbon nanotube films for damping applications", *Advanced Materials* 14, 997-1000 (2002).
[**2007 ISI impact factor for Advanced Materials is 8.191**]
- (48) **N. Koratkar**, and I. Chopra, "Closed-loop wind tunnel testing of a smart rotor model with trailing-edge flaps", *Journal of the American Helicopter Society* 47, 263-272, (2002).
- (49) **N. Koratkar**, and I. Chopra, "Open-loop hover testing of a smart rotor model", *AIAA Journal* 40, 1495-1502 (2002).
- (50) **N. Koratkar**, and I. Chopra, "Wind tunnel testing of a Mach-scaled rotor model with trailing-edge flaps", *Smart Materials and Structures* 10, 1-14 (2001).
- (51) **N. Koratkar**, and I. Chopra, "Analysis and testing of a Mach-scaled rotor with trailing-edge flaps", *AIAA Journal* 38, 1113-1124 (2000).
- (52) **N. Koratkar**, and I. Chopra, "Analysis and testing of a Froude-scaled helicopter rotor with piezoelectric bender actuated trailing-edge flaps", *Intelligent Material Systems and Structures* 8, 553-630 (1997).

b. Articles Under Review

- (1) "Hydrogen generation by water electrolysis using carbon nanotube electrodes", P. R. Mishra, A. S. K. Sinha, S. Talpatra, N. Koratkar, P. M. Ajayan and O. N. Srivastava, submitted to *Advanced Materials* (2008).
- (2) "Alumina nanoparticle polymer composites: high strain rate behavior", N. K. Naik, V. R. Kavala, W. Zhang and N. Koratkar, submitted to *Nanotechnology* (2008).
- (3) "Multiwalled carbon nanotube polymer composites: high strain rate characterization", N. K. Naik, V. R. Kavala, W. Zhang and N. Koratkar, submitted to *Carbon* (2008).

IV. Publications

C. In Conference Proceedings

- (1) "Vibration damping in carbon nanotube composites", J. Suhr and N. Koratkar, in proceedings of *KMCM's International Conference on Knowledge Management for Composite Materials, Nanotechnology and Alternate Energy*, Vancouver, Canada, 8-11 July (2008).
- (2) "The visualization of thin film evaporation on micro sintered copper mesh screen", C. Li, G.P. Peterson, J. Li and N. Koratkar, Proceedings of the *ASME summer heat transfer conference*, August 10-14, Jacksonville, FL (2008).
- (3) "Bubble Dynamics on Nanostructured Cu Surfaces", C. Li, N. Koratkar, and G. P. Peterson, *ASME Proceedings of MicroNano08*, June 3-5, Clear Water Bay, Kowloon, Hong Kong, P. R. China (2008).
- (4) "Carbon nanotube composites for rotorcraft application", A. Proper and N. Koratkar, In proceedings of the *AHS 64th Annual Forum and Technology Display*, April 29 - May 1, Montreal, Canada (2008).
- (5) "Suppression on fatigue crack growth in carbon nanotube epoxy composites", N. Koratkar, C. Picu, W. Zhang, *5th international conference on fracture of polymers, composites and adhesives*, Les Diablerets, Switzerland, 7-11 September (2008).
- (6) "Electro-chemical control of water transport through carbon nanotube membranes", Z. Wang, L. Ci, L. Chen, S. Nayak, P. Ajayan and N. Koratkar, *MRS Fall Meeting*, Boston, November 23-27 (2007).
- (7) "Damping in Nano-composite Materials- a Review," N. Koratkar, *Materials Science and Technology, MS&T Conference*, Detroit, MI, September (2007).
- (8) "Creep characterization of carbon nanotube composites", W. Zhang and N. Koratkar, *AIAA Structures, Structural Dynamics and Materials Conference*, Honolulu, Hawaii (2007).
- (9) "Interfacial friction damping in carbon nanotube composites", N. Koratkar, In proceedings of the *ASME Multifunctional Nanocomposites International Conference*, Honolulu, Hawaii, Sept 20-22, (2006).

- (10) "Hydrogen generation using Ruthenium nanorod array electrodes", S. Kim, T. Karabacak, T.-M. Lu and N. Koratkar, *SPIE's 13th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 2-5, (2006).
- (11) "Preventing interfacial slip in carbon nanotube composites", J. Suhr and N. Koratkar, *SPIE's 13th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 2-5, (2006).
- (12) "Facilitating interfacial slip in carbon nanotube composites", J. Suhr and N. Koratkar, In proceedings of *47th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 20-24, Newport (2006).
- (13) "Enhanced electron emission from nanorods grown by glancing angle deposition", R. Teki, J. P. Singh, T.-M. Lu and N. Koratkar, *3rd international conference on technological advances of thin films and surface coatings*, Singapore, December 11-15 (2006).
- (14) "Characterization of multiwalled carbon nanotube polymer composites", J. Suhr, N. Koratkar, L. Schadler, In proceedings of the *SPIE's 12th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 6-10, (2005).
- (15) "Characterizing self-heating in multiwalled nanotube coated piezoceramic sheet actuators", D.-B. Cho, N. Koratkar, In proceedings of *46th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 18-21, Austin, Texas, (2005).
- (16) "Comparing damping properties of singlewalled and multiwalled carbon nanotube polymer composites", J. Suhr, L. Schadler, P. Ajayan and N. Koratkar, In proceedings of *46th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 18-21, Austin, Texas, (2005).
- (17) "Nanostructured electrodes for efficient gas ionization", J. P. Singh, N. Koratkar, G.-C. Wang, T.-M. Lu, In proceedings of the *SPIE's 12th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 6-10, (2005).
- (18) "Effect of trailing-edge gurney flaps on aerodynamic efficiency of micro-rotorcraft", J. Nelson and N. Koratkar, In proceedings of the *AHS 60th Annual Forum and Technology Display*, June 7-10, Baltimore, MD (2004).
- (19) "Possibility to develop micro-actuators using carbon nanotubes", N. Koratkar, In proceedings of the *SPIE's 11th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 14-18, (2004).
- (20) "Viscoelastic characterization of carbon nanotube thin films", J. Suhr and N. Koratkar, In proceedings of the *SPIE's 11th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 14-18, (2004).
- (21) "Carbon nanotube array electrodes for gas sensing", A. Modi, N. Koratkar and P. Ajayan, In proceedings of the *45th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 19-22, Palm Springs, CA, (2004).
- (22) "Effect of surface temperature and heat transfer on the aerodynamic performance of micro-scale rotors", J. Kim and N. Koratkar, In proceedings of the *AHS 59th Annual Forum and Technology Display*, Phoenix, AZ, May 6-8, (2003).

- (23) "Power consumption of piezoceramic actuators with multiwalled carbon nanotube film deposition" A. Modi and N. Koratkar, In proceedings of the *SPIE's 10th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 2-6, (2003).
- (24) "Damping properties of carbon nanotube films" E. Lass and N. Koratkar, In proceedings of the *SPIE's 10th International Symposium on Smart Structures and Integrated Systems*, San Diego, CA, March 2-6, (2003).
- (25) "Temperature effects on resistivity of carbon nanotube films" E. Lass, A. Modi and N. Koratkar, In proceedings of the *44th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 7-10, Norfolk, VA (2003).
- (26) "Effect of unsteady blade motion on aerodynamic efficiency of micro-rotorcraft" J. Kim and N. Koratkar, In proceedings of the *44th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 7-10, Norfolk, VA, (2003).
- (27) "Engineered connectivity in nanotube systems for damping applications," E. Lass and N. Koratkar, In proceedings of *MRS Fall Meeting*, 740, December 2-6, (2002).
- (28) "Zero mass MEMs micro-jets for improved aerodynamic efficiency of micro-rotorcraft", T. Borca-Tasciuc and N. Koratkar, In proceedings of *SPIE's 9th International Symposium on Smart Structures and Integrated Systems*, March 18-21, San Diego, CA (2002).
- (29) "Shape memory alloy reinforced multi-functional composites", W. Zhang, M. Davis and N. Koratkar, In proceedings of *SPIE's 9th International Symposium on Smart Structures and Integrated Systems*, March 18-21, San Diego, CA (2002).
- (30) "Rotor blade design considerations for swashplateless main rotors", J. Kim, A. Messac and N. Koratkar, In proceedings of the *43rd AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 22-25, Denver, Colorado (2002).
- (31) "Novel carbon nanotube damping films", N. Koratkar, B. Wei and P. Ajayan, In proceedings of the *43rd AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 22-25, Denver, Colorado (2002).
- (32) "Aerodynamic design considerations for micro-rotorcraft", N. Gray, J. Kim and N. Koratkar, In proceedings of the *AHS 58th Annual Forum and Technology display*, June 11-13, Montreal, Canada (2002).
- (33) "Closed-loop hover testing of a Mach-scaled active flap rotor" N. Koratkar and I. Chopra, In proceedings of the *42nd AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 22-26, Seattle, WA (2001).
- (34) "Closed-loop wind tunnel testing of a Mach-scaled active flap rotor" N. Koratkar, M. Spencer and I. Chopra, In proceedings of the *AHS 57th Annual Forum and Technology display*, May 9-11, Washington DC (2001).
- (35) "Design of a high speed compound helicopter with a wing, pusher propeller and intermeshing main rotors", N. Koratkar, P. Samuel, M. Shaner, H. Prahlad, V. Madhavan, H. Park, N. Costes, W. Horn, V. Nagaraj, M. Tishchenko and I. Chopra, In proceedings of

- the *AHS vertical Lift Aircraft Design Conference*, January 18-21, Fisherman's Wharf, San Francisco, CA (2000).
- (36) "Open-loop hover testing of a Mach-scaled active flap rotor" N. Koratkar and I. Chopra, In proceedings of *SPIE's 7th International Symposium on Smart Structures and Integrated Systems*, March 3-6, Newport Beach, CA (2000).
- (37) "Open-loop wind tunnel testing of a Mach-scaled active flap rotor" N. Koratkar and I. Chopra, In proceedings of the *AHS 56th Annual Forum and Technology display*, May 3-5, Virginia Beach (2000).
- (38) "Vacuum chamber testing of a Mach-scaled smart rotor with trailing-edge flaps" N. Koratkar and I. Chopra, In proceedings of the *40th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference*, April 22-25, St. Louis, MO (1999).
- (39) "Development of a Mach-scaled smart rotor model with piezoelectric bender actuated trailing-edge flaps" N. Koratkar and I. Chopra, In Proceedings of the *AHS 55th Annual Forum and Technology display*, May 25-27, Montreal, Canada (1999).
- (40) "Feasibility study to develop a Mach-scaled helicopter rotor model with piezo-bimorph actuated trailing-edge flaps" N. Koratkar and I. Chopra, In proceedings of the *SPIE's 5th International Symposium on Smart Structures and Integrated Systems*, March 4-7, San Diego, CA (1998).
- (41) "Testing and validation of a Froude-scaled helicopter model with piezo-bimorph actuated trailing-edge flaps" N. Koratkar and I. Chopra, *SPIE's 4th International Symposium on Smart Structures and Materials*, March 2-6, San Diego, CA (1997).

D. Media Reports and Exhibits of Work:

Over 200 Media Reports citing Koratkar's research have appeared in top outlets including the NY times, USA today and Nature News. Koratkar has also been interviewed by BBC Radio and Northeast Public Radio and by CBS and ABC TV News in Albany, NY. The National Science Foundation has also issued a Press Release based on Koratkar's work in nano-composites.

Few sample reports are given below:

- (1) "Nanorods make boiling better", Published by **Nature** in the online news section (doi:10.1038/news.2008.935), July 4, 2008.
- (2) "Nanorods enhance boiling", Featured on **BBC Radio's Science in Action Program**, July 4, 2008.
- (3) "Pot Boiler: A New, Faster Way to Heat Water", **Scientific American**, July 8, 2008.
- (4) "Carbon nanotube 'shock absorbers' excel at dampening vibration", **Press Release issued by the National Science Foundation**, Jan-2005.
- (5) "Leap in sniffing: nanotubes can name that gas", Article in **New York Times**, August 19, 2003.
- (6) "Handheld bioterror detectors in works", Article in **USA Today**, July 7, 2003.
- (7) "Controlling the Movement of Water Through Nanotube Membranes", **Wikipedia**, the free encyclopedia, 2007.
- (8) Koratkar's nano-composite damping research was featured on the *formula-1official website* (<http://www.grandprix.com>), Feb. 13, 2006.
- (9) "University Team Creates Novel Nanotube Membranes to Control Water Transport", *NSTI Nanoscience and Technology Institute News*, Feb 19, 2007.
- (10) "Study expands potential for using nanotubes in water purification, genetic research", *Membrane Technology*, Issue 4, Page 8 (2007).
- (11) "Using Nanotubes To Detect and Repair Cracks in Aircraft Wings, Other Structures", *Nanotechwire*, 27th September (2007).
- (12) "Carbon Nanotubes to detect and repair cracks in structures", *Materials Research Society's Materials News*, October, 2007.
- (13) "Nanotube Arrays Make Droplets Jump or Jiggle", *Photonics Spectra*, September 2007.
- (14) "Viscoelasticity in carbon nanotube composites", *Materials Today*, March 2005.
- (15) "Carbon Nanotube "Shock Absorbers" Excel at Dampening Vibration", Article in *Materials News*, January-February 2005.
- (16) Carbon Nanotube 'Shock Absorbers' Excel At Dampening Vibration", Article in *Science Daily*, 21st January 2005.

- (17) "Carbon Nanotube "Shock Absorbers" Excel at Dampening Vibration", Article in *netcomposites*, 24th May, 2005.
- (18) "Carbon Nanotube "Shock Absorbers" Excel at Dampening Vibration", Article in *New Materials International*, 24th May, 2005.
- (19) "RPI Makes Nanotube Shock Absorbers", Article in *photonics.com*, January 12, 2005.
- (20) "Carbon Nanotube "Shock Absorbers" Excel at Dampening Vibration", Article in *nanotechwire.com*, 1/20/2005.
- (21) "New Class of Nanostructured Materials used to reduce Vibrations", Article in *STP-Gateway Hightech Online*, January 14, 2005.
- (22) "Carbon Nanotube "Shock Absorbers" Excel at Dampening Vibration", Article in *ipfrontline*, January 20, 2005.
- (23) "New Nanostructured Materials Featured in Nature Materials", article in *NYSTAR Nanotech Briefing Paper*, January 31, 2005.
- (24) "Carbon Nanotube "Shock Absorbers" Excel at Dampening Vibration", Article in *innovations report*, January 13, 2005.
- (25) "Rensselaer Wins NSF Grant To Develop Nanotube Sensors For Homeland Security", Article in *Enterprise Innovator.com*, May 27, 2005.
- (26) "RPI professor awarded NSF grant", Article in *Business Review*, Albany, NY, February 9, 2004.
- (27) "Rensselaer Wins NSF Grant To Develop Nanotube Sensors For Homeland Security", Article in *Next-Innovator*, September 01, 2004
- (28) "Rensselaer Polytechnic Institute Professor Will Develop New Nanostructured Vibration Reduction Materials", Article in *Nanotechwire.com*, February 21, 2004.
- (29) "Koratkar will develop new nanostructured vibration reduction materials", *NanoScience and NanoBusiness News from NanoApex*, Feb 17, 2004.
- (30) Research listed in the August 9, 2004 and February 9 2004 newsletters of the *New York State Office of Science, Technology and Scientific Research (NYSTAR)*
- (31) "Koratkar will develop new nanostructured vibration reduction materials", Article in *Sciencegroupsrv.com*, 16th February 2004.
- (32) "RPI researchers land \$1.3M grant for nanotech project", Article in *Business Review*, Albany, NY, August 18, 2004.
- (33) "Koratkar will develop new nanostructured vibration reduction materials", *Advanced Materials and Composites News*, February 13, 2004.
- (34) "Researchers Developing Nanotube Devices to Detect Chemical Warfare Agents", Article in *Homeland Response*, November 16, 2004.

- (35) “Gas sensors use nanotube parts”, Article in *Science News*, July 19, 2003.
- (36) “Nanotubes and gas detection”, Editorial article in *Gases and Technology*, Vol. 2, No. 6, (2003). *Gases and Technology* is the Magazine for News and Technical Developments in High-Technology Gas Markets.
- (37) “Nanotubes as miniaturized gas sensors”, Article in *Nanotechweb*, July 15, 2003.

E. Patents and Licenses

Inventor(s): Nikhil Koratkar, Ashish Modi, Eric Lass, Bingqing Wei, Pulickel Ajayan.

Title: Miniaturized gas sensors featuring electrical breakdown in the vicinity of carbon nanotube tips

Filing Date: Provisional Patent Application (RPI Case Number 740) was filed on December 20, 2002.

Status: U.S. Patent Pending (from PCT). Case number PCT/US2003/0406, also published under PCT filing as WO2004059298.

V. Research Grants and Contracts

(Give title of project, other senior investigators, starting and completion dates, and amount of funding, sponsoring agency.)

A. Proposals Approved and Funded

Total Award Amount (14 Grants): \$4.27 Million

Served or Serving as Principal Investigator on 13 of 14 Awards

Awards 1-7 are currently active; 6 RAs are supported by Koratkar from these funds

- (1) Sponsor: National Science Foundation
 Title: CAREER: Advanced Nanostructured Damping Materials
 Funds: \$400,000
 Period: 07/01/2004 - 06/31/2009
 Effort: Principal Investigator
 Associates: None

- (2) Sponsor: National Science Foundation
 Title: NIRT: Miniaturized Chemical Sensors Featuring Electrical Breakdown near Carbon Nanotube Tips
 Funds: \$1300,000
 Period: 09/01/2004 - 09/31/2009
 Effort: Principal Investigator
 Associates: Pulickel Ajayan, Theo Borca-Tasciuc, Saroj Nayak and Steve Cramer

- (3) Sponsor: National Science Foundation
 Title: NIRT: Fundamental Study of Electro- and Magneto-Mechanical Nano-Assemblies.
 Funds: \$1150,000
 Period: 09/01/2005 - 09/31/2009
 Effort: Co-Investigator
 Associates: Toh-Ming Lu, Theo Borca-Tasciuc, Mutsuhiro Shima and Gwo-Ching Wang

- (4) Sponsor: US Army- Penn State Vertical Lift Research Center of Excellence (VLRCOE)
 Title: Next Generation Carbon-Nanotube/Carbon-Fiber Composites for Mechanical Properties Enhancement and Structural Monitoring
 Funds: \$259,000
 Period: 06/01/2006 - 06/01/2011
 Effort: Principal Investigator
 Associates: Linda Schadler

- (5) Sponsor: National Science Foundation
 Title: Fundamental Study of Photo-Thermo-Mechanical Actuation in Carbon Nanotubes and their Composites
 Funds: \$200,000
 Period: 08/01/2007 - 07/31/2010
 Effort: Principal Investigator
 Associates: Assad Oberai

- (6) Sponsor: Motorola
Title: Carbon Nanotube Devices for RFID Application
Funds: \$195,000
Period: 01/1/2008 - 12/31/2010
Effort: Principal Investigator
Associates: None
- (7) Sponsor: US Army Benet Labs
Title: Fatigue Crack Growth Suppression in Carbon Nanotube Composites
Funds: \$15,000
Period: 01/1/2008 - 01/01/2009
Effort: Principal Investigator
Associates: None
- (8) Sponsor: US Army Aviation & Missile Research, Development & Engineering Center
Title: Carbon Nanotube Composites for Structural Health Monitoring
Funds: \$42,000
Period: 12/01/2007 - 8/30/2008
Effort: Principal Investigator
Associates: None
- (9) Sponsor: Department of Defense
Title: DURIP: Nano-Composites Characterization Facilities in Support of US Army Funded Research at the Rensselaer Polytechnic Institute
Funds: \$150,000
Period: 08/01/2007 - 08/31/2008
Effort: Principal Investigator
Associates: None
- (10) Sponsor: National Science Foundation
Title: NER: Water Electrolysis Activated by Nanostructured Electrodes: An Efficient Approach for Hydrogen Production
Funds: \$100,000
Period: 09/01/2006 - 09/01/2007
Effort: Principal Investigator
Associates: Toh-Ming Lu, Glenn A. Eisman
- (11) Sponsor: Army Research Office
Title: Multifunctional Carbon Nanotube Damping Films
Funds: \$238,552
Period: 04/13/2003 - 04/12/2006
Effort: Principal Investigator
Associates: Pulickel Ajayan, Prabhat Hajela
- (12) Sponsor: National Science Foundation
Title: NUE: Thermal and Electrical Transport in Carbon Nanotube Films
Funds: \$100,000
Period: 8/1/2003 - 04/01/2005
Effort: Principal Investigator
Associates: Pulickel Ajayan, Don Millard

- (13) Sponsor: National Science Foundation
 Title: NER: Minimally Intrusive Damping Films Featuring Carbon Nanotubes
 Funds: \$100,000
 Period: 9/1/2002 - 8/30/2003
 Effort: Principal Investigator
 Associates: Pulickel Ajayan
- (14) Sponsor: Mainstream Engineering Corporation
 Title: Carbon Nanotube Based Ultracapacitors for High Pulse-Power Applications
 Funds: \$21,000
 Period: 7/1/2004 - 2/30/2005
 Effort: Principal Investigator
 Associates: None

B. Revenue Sources Internal to Rensselaer

- (1) Sponsor: Office of Research, RPI
 Title: Exploratory Seed Research Grant
 Funds: \$50,000
 Contract: 01/01/2002 – 06/30/2003
 Effort: Principal Investigator
 Associates: Pulickel Ajayan, Saroj Nayak, Prabhat Hajela
- (2) Sponsor: Office of Undergraduate Education, RPI
 Title: Curriculum Innovation Grant
 Funds: \$10,000
 Contract: 07/01/2001 – 07/01/2002
 Effort: Principal Investigator
 Associates: None

C. Proposals Submitted and Not Funded with Current Status

Proposals Under Review

- (1) Sponsor: National Science Foundation
 Title: Fundamental study of nucleate boiling on nanostructured surfaces
 Funds: \$348,000
 Period: 09/01/2008 - 08/31/2011
 Effort: Co-Principal Investigator
 Associates: Yoav Peles (Principal Investigator)
- (2) Sponsor: Department of Homeland Security
 Title: Field ionization based lab-on-chip chemical sensor devices
 Funds: \$1,562,752
 Period: 01/01/2009 - 01/01/2012
 Effort: Co-Principal Investigator
 Associates: Saroj Nayak (Principal Investigator) and Theo Borca-Taciuc

Proposals Not Funded

1. National Science Foundation
"Novel Carbon Nanotube Reinforced Multi-Functional Composites"
Principal Investigator
Requested Amount - \$375,000
Submitted: July, 2001
2. National Science Foundation
"Biologically Inspired and Smart Structures Enabled Marine Locomotion for Unmanned Undersea Vehicles".
Co-Principal Investigator with Prof. A. Messac
Requested Amount: \$301,854
Submitted: October, 2001
3. NASA: University Research, Engineering and Technology Institute (URETI)
"Biologically Inspired Aerospace Materials and Structural Elements Based on Nanotechnology
Co-Principal Investigator with Profs M. Shur (Center Director), J. Dordick, P. Ajayan, P.Hajela, R. Kane, S. Garde, P. Keblinski, L. Shadler, K. Gertz, D. Siegel, T. Borca, J. Wen, X. Zhang, S. Wagner (Princeton), J. Strurm (Princeton), A. Klibanov (MIT), D. Carroll (Clemson) and G. Harris (Howard)
Amount Requested: \$13457,532; Submitted: December, 2001
4. Army Research Office
"Institute for Soldier Nanotechnologies ".
Co-Principal Investigator
Submitted with Profs D. Siegel (Center Director), J. Dordick, P. Ajayan, M. Shur, P. Hajela, R. Kane, S. Garde, P. Keblinski, L. Shadler, L. Interrante, Y. Akpalu, T. Borca, B. Benicewicz, C. Ryu, G. Ramanath, G. Belfort, C. Picu, J. Crivello, J. Moore, R. Bizious, J. Fish, S. Nayak, X. Chang, P. Persans, L. Schowalter, G. Wang, M. Washington, G. Dvorak, M. Shepard, T. Lu, M. Washington and J. Stenken
Amount Requested: \$50,000,000; Submitted: December, 2001
5. National Science Foundation
"An Integrated Theory-Experiment-Design Learning Prototype for Aerospace Engineering"
Co-Principal Investigator with Prof Z. Rusak
Funds Requested: \$100,000; Submitted: June, 2002
6. National Aeronautics And Space Administration
"Multifunctional Carbon Nanotubes Fims Featuring High Specific Strength/Stiffness And Damping"
Co-Principal Investigator with Profs. P. Ajayan and P. Keblinski
Funds Requested: \$517,132; Submitted: August, 2002
7. National Science Foundation
"NIRT: Miniaturized Chemical Sensors Featuring Electrical Breakdown in the Vicinity of Carbon Nanotube Tips and Carbon Nanotube based FETS"
Co-Principal Investigator with Profs P. Ajayan, T. Borca-Tasciuc, and S. Nayak
Funds Requested: \$1,563,365
Submitted: August, 2002.

8. National Science Foundation
“Sensors: Ionization at the Nanoscale- A Novel Approach to Gas Sensing”
Co-Principal Investigator with Profs P. Ajayan and S. Nayak
Funds Requested: \$474,949
Submitted: March, 2003.
9. National Science Foundation
“Sensors: Mesoscale Nanotube Structures as Multifaceted Thermal, Mechanical, and Chemical Sensors”
Principal Investigator
Funds Requested: \$216,042
Submitted: March, 2003.
10. National Institutes of Health
“Miniaturized Carbon Nanotube Devices for Highly Sensitive and Specific Detection of Biological and Chemical Species”
Co-Principal Investigator with Profs P. Ajayan and R. Kane
Funds Requested: \$562,992
Submitted: February, 2003
11. National Science Foundation
“NIRT: Study of Electro- and Magneto-Mechanical Nano-Assemblies”
Co-Principal Investigator along with Profs Toh-Ming Lu, Gwo-Ching Wang, Theodorian Borca-Tasciuc and Mutsuhiro Shima
Funds Requested: \$1,775,760
Submitted: October, 2003
12. National Science Foundation
“NER: Ionization at the Nanoscale- A Novel Approach to Bio-Sensing”
Co-Principal Investigator along with Prof Ravi Kane and Prof. Pulickel Ajayan
Funds Requested: \$129,985
Submitted: October, 2003.
13. University of Michigan
“MURI: Micro Hovering Aerial Vehicles with an Invertebrate Vision Inspired Navigation System”
Principal Investigator
Funds Requested: \$682,884
Submitted: November, 2003
14. Army Research Office
“MURI: Insect like Vision-Guided Autonomous Micro-Flying Bagel-Rotary System”
Co-Principal Investigator with Profs Z. Rusak, M. Amitay, Y. Peles and P. Kramer
Funds Requested: \$5,645,834
Submitted: November, 2003

15. National Institutes of Health
“Biological Sensors Featuring Ionization at the Nanoscales”
Co-Principal Investigator with Profs Pulickel Ajayan and Ravi Kane
Funds Requested: \$562,992
Submitted: February, 2004
16. National Institutes of Health
“Nanoscale Spring Structures as Novel Biological Sensors”
Co-Principal Investigator with Profs Ravi Kane and Toh-Ming Lu
Funds Requested: \$550,000
Submitted: August, 2004
17. Department of Energy
“Fundamental Study of Ionization and Gas Breakdown Mechanisms near Nanostructured Electrodes”
Co-Principal Investigator with Profs Toh-Ming Lu, Gwo-Ching Wang Theodorian Borca Tasciuc, Pulickel M. Ajayan and Saroj Nayak.
Funds Requested: \$380,221
Submitted: March, 2004.
18. National Science Foundation
“NER: Water Electrolysis Activated by Nanostructured Electrodes: An Efficient Approach for Hydrogen Production”
Co-Principal Investigator with Profs Toh-Ming Lu and Glen Eisman.
Funds Requested: \$159,964
Submitted: November, 2004.
19. National Science Foundation
“NER: Carbon Nanotubes as a New Platform for Electro-Polymerization, Recognition and Nano-Space Engineering”
Co-Principal Investigator with Profs George John (City College of New York) and Pulickel Ajayan
Funds Requested: \$75,668; Submitted: November, 2004.
20. National Science Foundation
“Sensors: A Novel Carbon Nanotube Ionization Detector for Bio-Sensing”
Co-Principal Investigator with Prof. Ajayan and Prof. Kane
Budget Amount: \$408,227
Submitted: March, 2005.
21. National Science Foundation
“IMR: Acquisition of a NanoTriboIndenter for Nanoscale Material Testing and Student Education in Science and Engineering”
Co-Principal Investigator with Prof. Picu, Prof. Lu, Prof. Blanchet and Prof. Tomozawa
Budget Amount: \$321,240
Submitted: February, 2005.

22. National Science Foundation
“NUE: Nanocomposite Damping Materials - A Unique Opportunity to show Students the Powerful Impact of Nanotechnology in the Macro World”
Co-Principal Investigator with Prof. Don Millard
Budget Amount: \$200,000, Submitted: March, 2005.
23. Department of Energy (Hydrogen Fuel Cell Initiative)
“Pt nanorod electrode structures for next generation PEM fuel cells”
Co-Principal Investigator with Prof. Toh-Ming Lu, Prof. Glenn Eisman and Prof. Tansel Karabacak (University of Arkansas).
Budget Amount: \$900,000, Submitted: March, 2006.
24. National Science Foundation
“NIRT- Pt nanorods for next generation proton exchange membrane fuel cells.”
Co-Principal Investigator with Prof. Toh-Ming Lu, Prof. Glenn Eisman, Prof. Tansel Karabacak (Univ. of Arkansas) and Prof. Jerome Darcy (Univ. of Arkansas).
Budget Amount: \$1327,642, Submitted: November, 2006.
25. National Science Foundation
“In-situ health monitoring in composites using carbon nanotube additives”
Budget Amount: \$300,000, Submitted: March, 2007.
26. National Science Foundation
“Fundamental study of nucleate boiling on nanostructured interfaces”
Co-Principal Investigator with Prof. Yoav Peles
Budget Amount: \$332,704, Submitted: October, 2007.
27. National Science Foundation
“In situ health monitoring in composites using carbon nanotube additives”
Principal Investigator
Requested Amount - \$303,000
Submitted: September 2007.
28. National Science Foundation
“Fatigue resistant composites featuring carbon nanotube additives”
Principal Investigator
Requested Amount - \$304,000
Submitted: September, 2007
29. National Science Foundation
“Pt nanorod catalyst electrode structures for next generation PEM fuel cells”
Co-Principal Investigator with Prof. Toh-Ming Lu and Prof. Glenn Eisman
Budget Amount: \$225,000, Submitted: October, 2007.
30. National Science Foundation: Materials Research Center (MRSEC)
“MRSEC for Hierarchical Responsive and Active Materials (HiRAM)”
Co-Principal Investigator with 20 other RPI faculty from chemical engineering, physics, materials science and mechanical engineering.
Budget Amount: \$13,572,459, Submitted: November, 2007.

VI. Editorship of Journals, Reviews of Manuscripts, Books, and Research Proposals

A. Editorship of Journals

Associate Editor, Nanoscience and Nanotechnology Letters 2008-present

Guest Editor for a special issue of the *Journal of Intelligent Materials Systems and Structures*. The special issue was intended to introduce the new and emerging area of nanostructured materials to the smart materials and structures community. Review of papers began in Fall 04 and the special issue was published in March 2006.

Member editorial board of the open applied physics journal 2007-present

B. Research Proposal Reviews

<i>Review Panel Member</i> : National Science Foundation Surface Engineering and Materials Design Program	2008	June
<i>Review Panel Member</i> : National Science Foundation Surface Engineering and Materials Design Program	2007	March
<i>Review Panel Member</i> : National Science Foundation Surface Engineering and Materials Design Program	2006	February
<i>Reviewer</i> : for proposal to National Science Foundation Electronic Materials Division	2006	December
<i>Review Panel Member</i> : National Science Foundation Nanoscale Interdisciplinary Research Team (NIRT) Program	2006	February
<i>Reviewer</i> : Several proposals submitted to the Army Research Office's Mechanical Sciences Division (7 Proposals)	2005 2004 2003	June June, July, August June, July, Oct,
<i>Review Panel Member</i> : National Science Foundation Faculty Early Career Development (CAREER) Program	2005	September
<i>Review Panel Member</i> : National Science Foundation Surface Engineering and Materials Design Program	2005	March
<i>Review Panel Member</i> : National Science Foundation Surface Engineering and Materials Design Program	2004	February
<i>Review Panel Member</i> : National Science Foundation Nanoscale Undergraduate Education Program	2004	February
<i>Reviewer</i> : for proposal to National Science Foundation Kinetics, Catalysis and Molecular Processes Program	2003	July
<i>Review Panel Member</i> : National Science Foundation Nanoscale Interdisciplinary Research Team (NIRT) Program	2002	March

C. Journal Reviews

Refereed papers for the following technical journals:

- **Advanced Materials** (4 articles: 2003, 2005, 2007 and 2008)
- **Advanced Functional Materials** (2 articles: 2006, 2007)
- **ACS Nano** (1 article: 2008)
- **Applied Physics Letters** (2 articles: 2008, 2009)
- Applied Surface Science (1 article: 2008)
- ASME Journal of Vibration and Acoustics (2 articles: 2008)
- AIAA Journal (1 article: 2001, 1 article 2006)
- ASME Journal of heat transfer (1 article 2006)
- **Chemistry of Materials** (1 article in 2007)
- Composites, Science and Technology (4 articles: 2003, 2004, 2008, 2008)
- Experimental Mechanics (1 article: 2002)
- Guidance Control and Dynamics (3 articles: 2003, 2005)
- Intelligent Material Systems and Structures (11 articles: 2002-2006, 1 in 2007)
- IEEE Transactions on Nanotechnology (1 article: 2005)
- IEEE Sensors Journal (1 article: 2006)
- **Journal of Physical Chemistry B** (1 article: 2004, 1 article 2007)
- Journal of Applied Physics (1 article 2008)
- Journal of Polymer Science Part B: Polymer Physics (1 article 2008)
- Journal of Nanoscience and Nanotechnology (1 article: 2008)
- Journal of Nanoparticle Research (1 article: 2004)
- Journal of Colloid and Interface Science (1 article: 2005)
- Journal of Sound and Vibration (1 article: 2005)
- Journal of Vibration and Control (1 article: 2005)
- Journal of Aircraft (1 article: 2004, 1 article 2007, 1 article 2008)
- Journal of the American Helicopter Society (1 article: 2006, 1 article: 2007)
- Journal of Applied Polymer Science (1 article in 2007)
- Journal of Materials Science (1 article in 2007)
- Journal of Vacuum Science & Technology (1 article 2007)
- Journal of Materials Research (1 article 2006, 2 articles in 2008)
- **Journal of the American Chemical Society** (1 article in 2007).
- **Langmuir** (2 articles in 2007).
- Measurement Science and Technology (1 article in 2008).
- Modeling & Simulation in Materials Science and Engineering (1 article: 2004)
- Mechanics of Advanced Materials & Structures (2 articles 2006).
- **Nano Letters (1 article 2008)**
- Optimization and Engineering (1 article: 2005)
- Physical Review Letters (2 articles: 2006, 2007)
- Physical Review B (2 articles in 2006), 4 in 2007.
- Smart Materials and Structures (8 articles: 2000-2002, 2006, 2 in 2007)
- Thin solid films (1 article 2006, 1 article 2007)

VII. Service

A. Service to the University

1. University, School and Departmental Committees

- AE curriculum co-ordinator -- 2007-present
- Member Department Committee on AE Curriculum -- 2001-Present
- Member Department ABET Committee for AE -- 2001-Present
- Member Department Chair Search Committee -- 2004-2005
- Member Institute Research Financial Information Committee -- 2004-2005

2. Other Service and Administration Activities

- Represented RPI at the coalition for national science funding exhibition at the Capitol Hill in Washington DC June 21, (2005). Described NSF funded nanotechnology research at RPI to **Members of Congress** and their staff. Specifically met with Congressman Michael R. McNulty (D) and senior staffers of the House Science Committee. Discussed with them the need to strengthen NSF funding to maintain the traditional advantage of the United States in science, technology and innovation. The Washington DC visit was sponsored by the RPI Office of Research.
- Provided nanotechnology review to members of the nanotechnology commercialization group and NanoHoldings LLC on behalf of the Rensselaer Polytechnic Institute's office of technology commercialization, September 13, (2005).
- Delivered nanotechnology related presentation to Mr. Adam Aston, Industries Editor of BusinessWeek on behalf of the RPI Office of Research, May 20, (2005).
- Delivered nanotechnology related presentation to Dr. John Brighton (National Science Foundation's Assistant Director of Engineering) and Dr. Michael Reischman (National Science Foundation's Deputy Assistant Director of Engineering) on behalf of the RPI Office of Research on Nov. 22, (2004).
- Delivered nanotechnology presentation to Ms. Carolyn Hanna (Department of Homeland Security Science and Technology (S&T) Directorate) on behalf of the RPI Office of Research on October 30, (2004).
- Presented an overview of the MANE Department to students and their parents at the "Discover Day" and "Medalist Day" events, in 2001, 2002, 2003, 2006 and 2007.
- Presented RPI Micro-Air-Vehicle Initiative to Mr Dennis Tito on May 17, (2002).
- Presented research overview to MANE Department Advisory Board on August 24, (2002).
- Conducted Freshman Advising Seminar for new students on July 19, (2002).
- Presented the curriculum development plans for Aerospace Structures & Controls Laboratory to Dr. David Dolling, of ABET review committee, Aug. (2001).
- Presentation to DARPA industry representatives, April 6 2005.
- Presentation to FedEx, May 16 (2007).
- Presented curriculum revision plans to MANE Department Advisory Board (2008).
- Mentor for two faculty (Matt Oehlshlaeger and Diana Borca-Tasciuc). Formal meetings with Matt and Diana are held two times per year. Also had several informal discussions with Diana with regard to selection of topic for her 2006 NER proposal.
- Nominated Matt Oehlshlaeger for the Class of 1951 teaching award in 2007.

3. Undergraduate Student Advising and Counseling

~ 40 Students per year (2001 - Present)

4. Graduate and Post-Doctoral Student Advising and Counseling

30 Students (2001 – Present)

VII. Service**B. Professional Societies**

- Session Chair of Symposium EE at the Materials Research Society (MRS) Fall Meeting in Boston, MA. (2008)
- Member Advisory Committee of KMCM's International Conference on Knowledge Management for Composite Materials, Nanotechnology and Alternate Energy, Vancouver, Canada, 8-11 July. (2008)
- Session Chair (Nano-Composites Session) at the Materials Science and Technology (MS&T) Conference, Detroit, MI (2007)
- Member Advisory Committee of KMCM's The International Conference on Knowledge Management for Composite Materials, Nanotechnology and Alternate Energy, Duesseldorf, Germany, 3-6 July (2007)
- Technical Chair of characterization of nano-composites conference (2006)
At the ASME Multifunctional Nanocomposites International Conference, Honolulu, Hawaii,
- Member Program Committee for the Damping and Isolation conference (part of SPIE's 2006 Symposium on Smart Structures and Materials). (2006)
- Member Program Committee for the Damping and Isolation conference (part of SPIE's 2005 Symposium on Smart Structures and Materials). (2005)
- Session Chair (Dampers and Actuators Session) at the SPIE Smart Materials and Structures Symposium, San Diego, CA (2005)
- Organizer of special session on "Carbon Nanotubes and its Applications" at the SPIE Smart Materials and Structures Symposium, San Diego, CA (2005)
- Member Program Committee for the Damping and Isolation conference (part of SPIE's 2004 Symposium on Smart Structures and Materials). (2004)
- Session Chair (Passive Damping Materials Session) at the SPIE Smart Materials and Structures Symposium, San Diego, CA (2004)
- Organizer of special session on "Carbon Nanotubes and its Applications" at the SPIE Smart Materials and Structures Symposium, San Diego, CA (2004)
- Faculty advisor to the RPI student design team participating in the AIAA sponsored Design-Build-Fly (DBF) competition (2004)
- Member AIAA Adaptive Structures Technical Committee (2003-Present)
- Member American Society of Mechanical Engineers (ASME) (2002-Present)

Faculty Advisor to RPI design teams participating in the AHS/Industry/NASA student design competitions	(2002-2003, 2005)
Member Sigma Xi	(2001-2003)
Faculty Advisor to the RPI Student Chapter of AHS	(2001-Present)
Member – AHS Education Committee	(2001-Present)
Faculty Advisor to the RPI student Chapter of the AIAA	(2001-2006)
Member American Inst. for Aero. & Astronautics (AIAA)	(1997-Present)
Member American Helicopter Society (AHS)	(1995-Present)

VIII. Professional and Public Lectures

1. “Exploiting Interfacial Slip in Carbon Nanotube Polymer Composites for Enhanced Damping and Fatigue Resistance”, Invited seminar hosted by the department of aerospace engineering, *Indian Institute of Science, Bangalore*, July 29 (2008).
2. “Interfacial and transport phenomena in micro and nano systems”, Invited seminar hosted by the department of Physics, *University of Arkansas at Little Rock*, November 14 (2008).
3. “Exploiting Interfacial Slip in Carbon Nanotube Polymer Composites for Enhanced Damping and Fatigue Resistance”, Invited seminar hosted by the Mechanical and Aerospace Engineering Department at *Polytechnic University, Brooklyn, NY*, June 26 (2008).
4. “Carbon nanotube composites for rotorcraft structural application”, presentation to Army, NASA and industry researchers at the Annual Rotorcraft Center Review at *Penn State University*, April 4 (2008).
5. “Characterizing energy dissipation in carbon nanotube composites”, Invited lecture at the Advanced Nanomaterials, ANM-2007 symposium, *Indian Institute of Technology, Bombay*, Jan 3-7 (2007)
6. “Water electrolysis using carbon nanotube array electrodes”, Invited Talk at the *ASME Applied Mechanics and Materials Conference*, Austin, TX, June 6-7 (2007).
7. “Interfacial and transport phenomena in micro and nano systems”, Invited seminar hosted by the department of Physics, *Indian Institute of Science, Bangalore*, December 14 (2007).
8. “Carbon nanotube composites for rotorcraft structural application”, presentation to Army, NASA and industry researchers at the Annual Rotorcraft Center Review at *Penn State University*, April 11 (2007).
9. “Nanostructured Materials- Synthesis, Patterning and Selected Engineering Applications”, seminar at the *Arizona State University*, December 1, (2006).
10. “Nanoscale Science and Technology”, Presentation to students and faculty of the *New Visions High School Program*, Troy, NY, November 14 (2006).

11. "Damping properties of carbon nanotube composites", Invited lecture for the carbon nanotube session at the *Materials Research Society (MRS) Spring Symposium* in San Francisco, CA, March 28 (2005).
12. "Carbon Nanotubes- Science, Engineering and Applications", Invited lecture, Dept. of Mechanical and Aeronautical Engineering, *Clarkson University*, October 14 (2005).
13. "Nanoscale chemical sensors for homeland defense", presentation to Mr. Adam Aston, Industries Editor of *BusinessWeek* on behalf of the *RPI Office of Research*, May 20, (2005).
14. "Introduction to Nanoscale Science and Technology", Presentation to students and faculty of the *New Visions High School Program*, Troy, NY, February 9, (2005).
15. "Flow control strategies for improved aerodynamic performance of micro-scale rotors", Invited lecture at the Indo-US Forum on Science & Technology's Workshop on Micro-Air-Vehicles, *National Aeronautics Laboratories (NAL)*, Bangalore, India, Aug 1 (2005).
16. Presented Research Overview to Dr. John Brighton (National Science Foundation's Assistant Director of Engineering) on behalf of the *RPI Office of Research* on Nov. 22, (2004)
17. Presented Research Overview to Dr. Michael Reischman (National Science Foundation's Deputy Assistant Director of Engineering) on behalf of the *RPI Office of Research* on Nov. 22, (2004)
18. Presented Research Overview to Ms. Carolyn Hanna (Department of Homeland Security Science and Technology (S&T) Directorate) on behalf of the *RPI Office of Research* on October 30, (2004).
19. Presented a seminar on Nanoscale Science and Technology at the *DARPA Sponsored Workshop* entitled, "Nano Air Vehicles for Sensor Emplacement", Lansdowne, VA, March 2-3, (2004). The presentation was attended by leading scientists from academia, industry and army research laboratories.
20. "Selected Engineering Applications of Nanostructured Materials", Invited lecture to the students and faculty of the *Materials Science and Engineering Department, Rensselaer Polytechnic Institute*, 15th April (2004).
21. "Nanoscale ionization gas sensors", Invited lecture at *Agharkar Research Institute*, Pune, India, January 3, (2004)
22. "Engineering applications of nanoscale science and technology", Invited lecture at the *Viswakarma Institute of Technology*, Pune, India, January 4, (2004).
23. "Carbon nanotube ionization gas sensors", Invited lecture at the *University of Pune*, India, January 8 (2004).
24. "Nanoscale devices for thermal, mechanical and chemical sensing", *City College of New York*, September 18, (2003).
25. "Multiwalled carbon nanotube electrode films for gas sensing", Invited lecture at the Knowledge Foundation's 4th *International Symposium on Detection Technologies: New Developments in Identification of Microorganisms and Chemicals*, Arlington, VA, December 9, (2003).

26. "State-of-art of chemical sensing using carbon nanotube technology", Invited lecture at the *International Conference on Nanoscience and Nanotechnology (ICONSAT)*, Organized by the department of Science and Technology, Government of India, Kolkata, India, December 17-20, (2003).
27. "Engineering applications of nano-scale science and technology", *Hindustan Aeronautics Limited (HAL)*, Nashik, India, December 22 (2002).
28. "Development of a smart rotor for active control of helicopter vibration", Invited lecture at the 5th International Conference on Adaptive Structures (ICAST), *University of Maryland, College Park*, October 15 (2001)
29. "Nano-technology applications to multi-scale systems", *Indian Institute of Technology*, Bombay, India, December 26 (2001).
30. "Development and Testing of a Smart Rotor Model", Department of mechanical engineering, *Rensselaer Polytechnic Institute*, February 8, (2000).
31. "Development of a smart rotor with piezoelectric bender actuated trailing-edge flaps", *University of Missouri, Rolla, MO*, March 22 (2000)
32. "Closed-loop wind tunnel testing of a Mach-scaled active flap rotor", *Sikorsky/AHS Sponsored Workshop on Application of Smart Structures Technology to Rotorcraft Systems*, Sept 14-17, Hartford, CT, (2000).
33. "Development of a Mach-scaled smart rotor with piezoelectric bender actuated trailing-edge flaps", *3rd Army Research Office Workshop on Smart Structures and Materials*, June 1-3, Penn. State, PA, (1999).
34. "Development of a smart rotor with piezoelectric bender actuated trailing-edge flaps for active vibration and noise control" *Indian Institute of Technology*, Bombay, India, September 30 (1998).
35. "Analysis and testing of a Froude-scaled smart rotor with piezoelectric bender actuated trailing-edge flaps", *2nd Army Research Office Workshop on Smart Structures and Materials*, May 9-11, Virginia Tech, VA, (1997).

IX. Honors and Awards (Koratkar and his graduate students)

1. Doctoral Student (Zuankai Wang) was awarded the **outstanding graduate student award** by the Government of China for Chinese students studying overseas. (2008)
2. Doctoral Student (Zuankai Wang) awarded the **Materials Research Society Graduate Student Award** at the MRS Fall meeting in Boston (2007)
3. Doctoral Student (Zuankai Wang) awarded the Materials Research Society Travel Award to attend the MRS Fall meeting in Boston (2007)
4. Rensselaer Polytechnic Institute **Early Career Award** (2005)
5. *Faculty Advisor* to the RPI design team that won 1st place in the Annual AHS/Industry/NASA Student Design Competition (Undergraduate Category) (2005)

6. NSF Faculty Early Career Development (**CAREER**) Award. (2004)
7. Rensselaer, School of Engineering, **SOE Excellence in Research** Award (2004)
8. American Helicopter Society's, **Francois Xavier Bagnoud** Award for outstanding contribution to vertical flight technology. (2004)
9. Doctoral Student (Jongmin Kim) was awarded the American Helicopter Society's *Robert L. Lichten Award*. (2004)
10. Masters Students (A. Modi and E. Lass) were selected as two of six Finalists at the *SPIE Best Student Paper* competition. (2003)
11. Named in Strathmore's *WHO'S WHO list* and AcademicKeys *WHO's WHO in Engineering Education* (2003)
12. *Faculty Advisor* to the RPI design team that won 2nd place in the Annual AHS/Industry/NASA Student Design Competition (Undergraduate Category) (2003)
13. *Faculty Advisor* to the RPI design team that won 1st place in the Annual AHS/Industry/NASA Student Design Competition (Undergraduate Category) (2002)
14. *Curriculum Innovation Grant*, Dean of Undergraduate Education, RPI (2001)
15. American Helicopter Society *Vertical Flight Foundation Award* (1999)
16. American Helicopter Society *Joseph P. Cribbin's Award* for significant contribution to Vertical Flight Technology by a Graduate Student. (1999)
17. *Team Leader* of University of Maryland's winning entry to the AHS/Industry/NASA Student Design Competition (Graduate Category). (1999)
18. University of Maryland *Minta Martin Fellowship* for Aerospace Research Excellence (1998)
19. American Helicopter Society, South-East Region *Robert Lichten Award* for Best First-Time Technical Paper by a Society Member (1998)
20. SPIE Smart Structures Conference *Best Student Paper Finalist* (1998)
21. University of Maryland, *Graduate School Fellowship* (1995)

X. Sabbatical Leaves, Off-Campus Study Programs,

XI. Other Activities

0.75 days consulting for YTCA, Inc. CA on 12/14/2004