

THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering
Resume

FULL NAME: Laxminarayan L. Raja **TITLE:** Associate Professor

ENDOWED POSITION: Robert and Francis Stark Centennial Fellowship in Engineering

DEPARTMENT: Aerospace Engineering and Engineering Mechanics

EDUCATION:

Indian Institute of Technology, Madras	Aerospace Engineering	B. Tech	1990
Texas A&M University	Nuclear Engineering	M.S.	1992
The University of Texas at Austin	Mechanical Engineering	Ph.D.	1996

PROFESSIONAL REGISTRATION: Not Registered

CURRENT AND PREVIOUS ACADEMIC POSITIONS:

Research Assistant, Department of Nuclear Engineering, Texas A & M University, College Station, TX, Aug. 1990 – May 1992

Research and Teaching Assistant (combined), Thermal/Fluids Section, Mechanical Engineering, The University of Texas at Austin, Austin, TX, Aug. 1992 – Jan. 1997

Post-doctoral Fellow, Division of Engineering, Colorado School of Mines, Golden, CO, Feb. 1997 – July 1999

Assistant Professor, Division of Engineering, Colorado School of Mines, Golden, CO, Aug. 1999 – Aug. 2002

Assistant Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Jan. 2002 – Aug. 2006

Associate Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, effective Sept. 2006

CONSULTING:

ITN Energy Systems, Wheatridge, Colorado, June 1999

MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES:

Member, The Combustion Institute, 1998

Member, The Electrochemical Society, 1999

Member, American Vacuum Society, 2001

Member, American Physical Society, 2003

Member, American Institute of Aeronautics and Astronautics, 2004

PROFESSIONAL SOCIETY AND MAJOR GOVERNMENTAL COMMITTEES, EDITORIAL BOARDS, AND CONFERENCES ORGANIZED/CHAIR:

Co-organizer, Editorial Room, 27th Symposium (International) on Combustion, Boulder, CO, Aug. 2-7, 1998.

Conference Session Chair, Spring 2000 Meeting of the Western States Section, The Combustion Institute, Session on "Catalysis and Sprays," Mar. 13-14, 2000.

Session Chair, 4th International Symposium on Applied Plasma Science, Kyoto, Japan, Sept. 1-5, 2003, (chaired session on Environmental Applications of Plasmas).

Organizing Committee, 2004 Gordon Research Conference on Plasma Processing Science, (helped organize session on Atmospheric Pressure Glow Discharges), held Aug. 16-20, 2004.

Executive Committee, 2005 The 5th International Symposium on Applied Plasma Science, Hilo, Hawaii, Sept. 26-30, 2005

Editorial Board, 2005, *Advances in Applied Plasma Science*, Vol. 5, publication of the Institute of Applied Plasma Science.

Local Organizing Committee, *Gaseous Electronics Conference*, Dallas, Texas, Oct. 2008

Organizing Committee, *Gaseous Electronics Conference*, Saratoga Springs, New York, 20-23 Oct. 2009
 Organizing Committee, *Advances in the Kinetic Description of Low-Temperature Plasmas: Applications to Modeling and Simulation*, Saratoga Springs, New York, 19 Oct 2009
 Session Organizer and Chair for Plasma Thrusters session, International Conference on Plasma Science (ICOPS), Norfolk VA, June 2010.

OTHER PROFESSIONAL HIGHLIGHTS

Paper Reviews:

Catalysis Today, May 1999.
AIChE Journal, June 2000.
IEEE Transactions on Plasma Science, 2002 - 2008
Comm. in Num. Methods in Engineering, 2003
Plasma Sources Science and Technology, 2003, 2008, 2009
Physics of Fluids, March 2006
Journal of Computational Physics, 2008
AIAA J. of Propulsion and Power, 2008, 2009

Proposal Reviews :

National Science Foundation, Career Panel, Sept 2008
American Chemical Society, Petroleum Research Fund, 2001, Sept 2006
National Science Foundation, Panel Review, CCLI Program, June 2001
National Science Foundation, Applied Math & Comp. Math Program, Mar. 2002.
National Science Foundation, CTS Division, (Apr. 2003, Apr. 2004, May 2004, Aug. 2004, Jan. 2005).
Department of Energy, Plasma Physics Jr. Fac. Program, (May 2003).
Department of Energy/NSF, Partnership in Plasma Science (Dec 2008)
Department of Energy, (Oct 2009).
Office of Vice President, UT-Austin, Research Grant Proposal (Nov. 2003)
The Kentucky Science and Engineering Foundation's R&D Excellence Program (Aug. 2005)

UNIVERSITY COMMITTEES/ADMINISTRATIVE ASSIGNMENTS:

Cockrell School of Engineering

Member, ASE UG Curriculum Committee, 2006-07
 Academic Support Committee, Spring 2009.

Department

Member, Undergraduate Program Evaluation and Improvement Committee, 2002-05
 Member, Fluids Ph. D. Qualifying Exam Committee, 2002-04
 Member, Aerothermodynamics Ph. D. Qualifying Exam Committee, 2005
 Member, ASE Graduate Studies Committee, 2002-05
 Sigma Gamma Tau Advisor, 2007-08

HONORS AND AWARDS:

Alpha Nu Sigma, National Honor Society in Nuclear Science and Engineering, 1992
 Tau Beta Phi, National Engineering Honor Society, 1994
 CAREER Award, National Science Foundation, Washington, DC, 2001
 Dean's Fellow, College of Engineering, UT-Austin, Spring 2006.
 Invited Plenary Talk, International Scientific Committee and the Organizing Committee of the 3rd International Workshop on Microplasmas, May 2006 Conference, Greifswald, Germany.
 Invited Talk, Gordon Research Conference on Plasma Processing Science, July 16-21, 2006 Mount Holyoke College, South Hadley, MA, USA
 Robert and Francis Stark Centennial Fellowship in Engineering, Aug. 2007 to present
 Invited Talk, Gaseous Electronic Conference, APS, Saratoga Springs, 20-23 Oct 2009.

PUBLICATIONS:**Refereed Journal Publications** (*indicates corresponding author)

1. L.L. Raja, A. K. Sreekanth, S. Santhakumar*, "Internal gas dynamics analysis of a compressed gas launcher", *Journal of Aeronautical Society of India*, Vol. 42, No.4, Nov. 1990, pp. 305-308.
2. Y.A. Hassan* and L.L. Raja, "Simulation of Loss of RHR During Midloop Operations and the Role of Steam Generators in Decay Heat Removal Using the RELAP5/MOD3 code," *Nuclear Technology*, Vol. 103, Sept. 1993, pp. 310-319.
3. Y.A. Hassan* and L.L. Raja, "Analysis of Experiments for Steam Condensation in the Presence of Noncondensable Gases Using the RELAP5/MOD3 Code," *Nuclear Technology*, Vol. 104, No. 1, Oct. 1993, pp. 76-88.
4. L.L. Raja, P.L. Varghese, and D.E. Wilson*, "Modeling of the Electrothermal Ignitor Metal Vapor Plasma for Electrothermal-Chemical Guns," *IEEE Transactions on Magnetics*, Vol. 33, No. 1, Jan. 1997, pp. 316-321.
5. L.L. Raja, P.L. Varghese, and D.E. Wilson*, "Modeling of the Electrogun Metal Vapor Plasma Discharge," *AIAA Journal of Thermophysics and Heat Transfer*, Vol. 11, No. 3, July-Sept. 1997, pp. 353-360.
6. D.E. Wilson*, K. Kim, and L.L. Raja, "Theoretical Analysis of an External Pulsed Plasma Jet," *IEEE Transactions on Magnetics*, Vol. 35, No. 1, Jan. 1999, pp. 228-233.
7. L.L. Raja*, R.J. Kee, and L.R. Petzold, "Simulation of Transient, Compressible, Gas-Dynamic, Behavior of Catalytic-Combustion Ignition in Stagnation Flows," *Proceedings of the Combustion Institute*, Vol. 27, 1998, pp. 2249-2257. (formerly titled *Twenty-Seventh Symposium (International) on Combustion*).
8. L.L. Raja*, R.J. Kee, O. Deutschmann, J. Warnatz, and L.D. Schmidt, "A Critical Evaluation of Navier-Stokes, Boundary-Layer, and Plug-Flow Models of the Flow and chemistry in a Catalytic Combustion Monolith," *Catalysis Today*, Vol. 59, 2000, pp. 47-60.
9. H.G. Im*, L.L. Raja, R.J. Kee, and L.R. Petzold, "A Numerical Study of Transient Ignition in a Counterflow Nonpremixed Methane-Air Flame Using Adaptive Time Integration," *Combustion Science and Technology*, Vol. 158, 2000, pp. 341-363.
10. L.L. Raja*, R.J. Kee, R. Serban, and L.R. Petzold, "Computational Algorithm for Dynamic Optimization of Chemical Vapor Deposition Processes in Stagnation Flow Reactors," *Journal of the Electrochemical Society*, Vol. 147, No. 7, 2000, pp. 2718-2726.
11. R.J. Kee*, W.-H. Yang, L.L. Raja, and C.A. Wolden, "The Influence of Pressure, Fluid Flow, and Chemistry on the Combustion-Based Oxidation of Silicon," *Proceedings of the Combustion Institute*, Vol. 28, 2000, pp. 1381-1388.
12. X. Yuan and L. L. Raja*, "Role of Trace Impurities in Large-Volume Noble Gas Atmospheric-Pressure Glow Discharges," *Applied Physics Letters*, Vol. 81, No. 5, July 2002, pp. 814-816.
13. T. L. Vincent and L.L. Raja*, "Approach for Control of High-Density Plasma Reactors Through Optimal Pulse Shaping," *Journal of Vacuum Science and Technology A*, Vol. 20, No. 5, Sept./Oct. 2002, pp. 1722-1732.
14. L. L. Raja* and M. Linne, "Analytical Model for Ion Angular Distribution Functions at rf Biased Surfaces with Collisionless Plasma Sheaths," *Journal of Applied Physics*, Vol. 92, No. 12, Dec. 2002, pp. 7032-7040.
15. P. Kothnur, X. Yuan, and L. L. Raja*, "Structure of Direct-Current Microdischarge Plasmas in Helium," *Applied Physics Letters*, Vol. 82, No. 4, Jan. 2003, pp. 529-531.
16. X. Yuan and L. L. Raja*, "Computational Study of Capacitively Coupled High-Pressure Glow Discharges in Helium," *IEEE Transactions on Plasma Science*, Vol. 31, No. 4, Aug. 2003, pp. 495-503.
17. J. Shin and L. L. Raja*, "Dynamics of Pulse Phenomena in Helium Dielectric-Barrier Atmospheric-Pressure Glow Discharges," *Journal of Applied Physics*, Vol. 94, No. 12, Dec. 2003, pp. 7408-7415.
18. T. L. Vincent* and L. L. Raja, "Optimal Pulse Shaping for Plasma Processing," *IEEE Transactions on Control Systems Technology*, Vol. 12, No. 1, Jan. 2004, pp. 75-86.
19. G. Chen and L. L. Raja*, "Fluid Modeling of Electron Heating in Low-Pressure, High-Frequency Capacitively Coupled Plasma Discharges," *Journal of Applied Physics*, Vol. 96, No. 11, Dec. 2004, pp. 6073-6081.
20. P. S. Kothnur and L. L. Raja*, "Two-Dimensional Simulation of a Direct-Current Microhollow Cathode Discharge," *Journal of Applied Physics*, Vol. 97, Feb. 2005, pp. 043305-1-12.
21. P. S. Kothnur, J. Shin, and L. L. Raja*, "Experimental and Numerical Study of External Plume Characteristics in Microhollow Cathode Discharges," *IEEE Transactions on Plasma Science*, Vol. 23, No. 2, Apr. 2005, pp. 564-565. (4th Triennial Special Issue on Images in Plasma Science).
22. J. Shin and L. L. Raja*, "Microdischarge-Assisted Ignition of Dielectric-Barrier High-Pressure Glow Discharges," *Applied Physics Letters*, Vol. 88, Jan. 2006, pp. 021502-1-3.
23. X. Yuan, J. Shin, and L. L. Raja*, "One-Dimensional Simulations of Multi Pulse Phenomena in Dielectric-Barrier Atmospheric-Pressure Glow Discharges," *Vacuum*, Vol. 80, Sept. 2006, pp. 1199-1205.

24. G. Chen, A. V. Arefiev, R. D. Bengtson, B. N. Breizman, C. A. Lee, and L. L. Raja, "Resonant power absorption in helicon plasma sources," *Physics of Plasmas*, Vol. 13, Dec. 2006, pp. 123507-1-11.
25. P. S. Kothnur and L. L. Raja*, "Simulation of direct-current microdischarges for application in electro-thermal class of small satellite propulsion devices," *Contributions to Plasma Physics*, Vol. 27, No. 1-2, Feb. 2007, pp. 9-18.
26. J. Shin and L. L. Raja*, "Long Time Scale Transient Phenomena in Dielectric-Barrier Atmospheric-Pressure Glow Discharges," *Journal of Physics D: Applied Physics*, Vol 40, No. 10, May 2007, pp. 3145-3154.
27. J. Shin, V. Narayanaswamy, L. L. Raja*, and N. T. Clemens*, "Characterization of a Direct-Current Glow Discharge Plasma Actuator in Low-Pressure Supersonic Flow," *AIAA Journal*, Vol. 45, no. 7, July 2007, pp. 1596-1605.
28. T. Deconinck, S. Mahadevan and L. L. Raja*, "Simulation of Direct-Current Surface Plasma Discharge Phenomena in High-Speed Flow Actuation," *IEEE Transactions on Plasma Science*, Vol. 35, No. 5, Oct 2007, pp. 1301-1311.
29. T. Deconinck, S. Mahadevan and L. L. Raja*, "Simulation of a Direct-Current Microdischarge for the Micro Plasma Thrusters," *IEEE Transactions on Plasma Science*, Vol. 36, No. 4, Aug. 2008, pp. 1200-1201. (5th Triennial Special Issue on Images in Plasma Science).
30. J. Shin, N. T. Clemens*, and L. L. Raja*, "Schlieren Imaging of Flow Actuation Produced by Direct-Current Surface Glow Discharge in Supersonic Flows," *IEEE Transactions on Plasma Science*, Vol. 36, No. 4, Aug. 2008, pp. 1316-1317. (5th Triennial Special Issue on Images in Plasma Science).
31. D. F. Berisford, R. D. Bengtson*, L. L. Raja*, L. D. Cassady, and W. J. Chancery. "Heat Flow Diagnostics for Helicon Plasmas," *Review of Scientific Instruments*, Vol. 79, No. 10, Oct 2008, pp. 10F515-1-3.
32. T. Deconinck and L. L. Raja*, "Modeling of Mode Transition Behavior in Argon Microhollow Cathode Discharges," *Plasma Processes and Polymers*, Vol. 6, No. 5, May 2009, pp. 335-346. (**Invited paper**)
33. T. Deconinck, S. Mahadevan, and L. L. Raja*, "Discretization of the Joule Heating Term for Plasma Discharge Fluid Models in Unstructured Meshes," *Journal of Computational Physics*, Vol. 228, No. 12, July 2009, pp. 4435-4443.
34. T. Deconinck, S. Mahadevan, and L. L. Raja*, "Computational simulation of coupled nonequilibrium discharge and compressible flow phenomena in a micro plasma thruster," *Journal of Applied Physics*, Vol. 106, Oct 2009, pp. 063305 1-13.
35. V. Narayanaswamy, L. L. Raja*, and N. T. Clemens*, "Characterization of a High-Frequency Pulsed Plasma Jet Actuator," *AIAA J.* (in review).
36. J. Shin and L. L. Raja*, "Cathode-sheath driven low-speed aerodynamic flow actuation using direct-current surface glow discharges," *Journal of Electrostatics*, (in review).
37. D. F. Berisford, R. D. Bengtson*, and L. L. Raja*, "Power balance and wall erosion measurements in a helicon plasma," *Physics of Plasmas*, (in review).
38. S. Mahadevan and L. L. Raja, "Simulations of direct-current air glow discharge at pressures ~ 1Torr: discharge model validation," *Journal of Applied Physics*, (in review).

Refereed Conference Proceedings

1. L.L. Raja*, A.K. Sreekanth, and S. Santhakumar, "Internal Gasdynamic Analysis of a Compressed Air Launcher," 5th National Conference on Aerodynamics, Aeronautical Society of India, Pune, India, May 1990, pp. 305-308.
2. D.E. Wilson*, L.L. Raja, and N. Petviashvili, "Theoretical Analysis of the External Pulsed Propellant and Plasma Jets," AIAA Paper 98-1000, 36th Aerospace Sciences Meeting & Exhibit, Reno, NV, Jan. 12-15, 1998.
3. R.J. Kee* and L.L. Raja, "Opportunities for Microgravity Research in the Development of Practical Catalytic Combustion Systems," Space Technology Applications International Forum (STAIF-98), American Institute of Physics, Vol. 420, Albuquerque, NM, Jan. 25-29, 1998.
4. P.V. Meyers*, R.J. Kee, L.L. Raja, C.A. Wolden, and M. Aire, "Atmospheric Pressure chemical vapor deposition of CdTe – Reactor design considerations," NCPV Photovoltaics Program Review, (Eds. M. Al-Jassim, J. P. Thorton and J.M. Gee), American Institute of Physics, Woodbury, NY, 1999, pp. 218-223.
5. L.L. Raja, R.J. Kee*, R. Serban, and L.R. Petzold, "Dynamic Optimization of Chemically Reacting Stagnation Flows," (**Invited paper**) in *Fundamental Gas-phase and Surface Chemistry of Vapor-Phase Materials Synthesis*, (Eds. M.D. Allendorf, M.R. Zachariah, L. Mountziaris, and A.H. McDaniel), Electrochem. Soc. Proc. Series 98-23, 1999, pp. 340-351.

6. L.L. Raja*, "Stochastic Modeling of Chemical Phenomena on Nanoscale Combustion Catalyst Surfaces," Spring 2000 Meeting of the Western States Section, The Combustion Institute, Philadelphia, PA, Mar. 2000.
7. T. L. Vincent* and L.L. Raja, "Theory of Optimal Pulse Shaping for Plasma Processing," Proc. American Control Conference, Anchorage, AK, May 8-10, 2002, pp. 5119-5125.
8. G. Holt*, S. Stewart, J. Mauldin, T. Campbell, P. Eckhoff, H. Elmarsi, B. Evans, M. Garg, J. Greenbaum, M. Linford, M. Poole, E. G. Lightsey, L. L. Raja, "Relative Navigation, Microdischarge Plasma Thruster, and Distributed Communication Experiments on the FASTRAC Mission," SSC03-XI-04, 17th Annual AIAA/USU AIAA Conference on Small Satellites, Logan, UT, Aug. 2003.
9. P. S. Kothnur* and L. L. Raja, "Two-Dimensional Computational Modeling of the Structure of Direct-Current Microdischarges," AIAA Paper 2004-987, 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 5-8, 2004.
10. X. Yuan, J. Shin, and L. L. Raja*, "One-Dimensional Simulation of Multi Pulse Phenomena in Dielectric-Barrier Atmospheric-Pressure Glow Discharges, ISAPS'05, Advances in Applied Plasma Science, Vol. 5, Hawaii, Sept. 2005.
11. T. Deconinck*, S. Mahadevan, and L. L. Raja, "Self-Consistent Two-Dimensional Simulations of Glow Discharge Phenomena for High-Speed Flow Control," AIAA Paper 2006-372, 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 9-12, 2006.
12. J. Shin*, V. Narayanaswamy, L. L. Raja, N. Clemens, "Generation of Plasma Induced Flow Actuation by DC Glow-like Discharge in a Supersonic Flow," AIAA Paper 2006-169, 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 9-12, 2006.
13. J. Shin*, V. Narayanaswamy, L. L. Raja, N. Clemens, "Characteristics of a plasma actuator in Mach 3 flow," AIAA Paper 2007-0788, 45th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 9-12, 2007.
14. J. Shin*, S. Mahadevan, V. Narayanaswamy, L. L. Raja, N. Clemens, "Forcing mechanisms in a direct-current surface plasma actuator in a supersonic flow," 18th International Symposium on Plasma Chemistry, Kyoto, Japan, Aug. 29, 2007.
15. U. Kc, J. Bingaman, P. L. Varghese, and L. L. Raja, "Studies of a Direct Current Microdischarge Based Miniaturized Plasma Thruster", 2nd European Conference for Aerospace Sciences (EUCASS), Brussels, Belgium, July 1-6, 2007.
16. J. Shin, S. Mahadevan, V. Narayanaswamy, N. T. Clemens, and L. L. Raja, "Forcing Mechanisms in a Direct-Current Surface Plasma Actuator of a Supersonic Flow," 18th International Symposium on Plasma Chemistry, Kyoto, Japan, Aug. 29 2007.
17. T. Deconinck, S. Mahadevan, and L. L. Raja, "Simulation studies of direct-current microdischarges for microelectric propulsion," 4th International Workshop on Microplasmas, Tainan, Taiwan, Oct. 29, 2007.
18. S. Mahadevan and L. L. Raja "Simulations of Glow Discharge Phenomena in Air for High-Speed Flow Control" AIAA Paper 2008-1093, 46th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 7-10, 2008.
19. V. Narayanaswamy, J. Shin, N. T. Clemens, and L. L. Raja, "Investigation of plasma-generated jets for supersonic flow control," AIAA paper 2008-285, 46th AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nevada, January 2008.
20. T. Deconinck, S. Mahadevan, and Laxminarayan Raja, "Simulation Studies of Direct-Current Microdischarges for Electric Propulsion," AIAA Paper 2009-1382, 47th AIAA Aerospace Sciences Meeting, Orlando, FL, 5-8 January 2009.
21. S. Mahadevan and L. L. Raja, "Simulations of Direct-Current Air Surface Plasma Discharges in Supersonic Flow," AIAA Paper 2009-1192, 47th AIAA Aerospace Sciences Meeting, Orlando, FL, 5-8 January 2009.
22. D. Breden, S. Mahadevan, and L. L. Raja, "Computational simulation of nanosecond pulsed plasma assisted ignition of a supersonic fuel-oxidizer stream," AIAA Paper 2009- , 40th AIAA Plasma Dynamics and Lasers Conference, San Antonio, TX, 22-25 June 2009.
23. U. KC, T. Deconinck, P. L. Varghese, and L. L. Raja, "Experimental and numerical studies of a DC microdischarge plasma thruster," European Conference for Aero-Space Sciences (EUCASS), Versailles, France, July 6-10, 2009.

Technical Reports

1. P.V. Meyers, R. Kee, C. Wolden, L.L. Raja, V. Kaydanov, T. Ohno, R. Collins, M. Aire, J. Kestner, and A. Fahrenbruch, "Atmospheric Pressure Chemical Vapor Deposition of CdTe for High Efficiency Thin Film PV Devices," National Renewable Energy Laboratory Subcontractor Report, NREL/SR-520-26566, Sept. 1999.

2. P.V. Meyers, R. Kee, C. Wolden, J. Kestner, L.L. Raja, V. Kaydanov, T. Ohno, R. Collins, and A. Fahrenbruch, "Atmospheric Pressure Chemical Vapor Deposition of CdTe for High Efficiency Thin Film PV Devices," National Renewable Energy Laboratory Subcontractor Report, NREL/SR-520-28375, May 2000.
3. H.G. Im, L.L. Raja, R.J. Kee, A.E. Lutz, and L.R. Petzold, "OPUS: A Fortran Program for Unsteady Opposed-Flow Flames," Sandia Report SAND2000-8211, Sandia National Laboratories, Albuquerque, NM, 2000.

ORAL PRESENTATIONS: (* indicates presenter)

Invited Talks:

1. L.L. Raja, "Gas Flow Transport and Chemistry Issues in Catalytic Combustion," Department of Environmental Science and Engineering Seminar, Colorado School of Mines, Mar. 30, 2000.
2. L.L. Raja, "Gas Flow Transport and Chemistry Issues in Catalytic Combustion," Department of Chemical and Petroleum Engineering Seminar, Colorado School of Mines, Mar. 30, 2000.
3. L.L. Raja, "A Model-Based Approach for the Design, Optimization, and Control of Metal-Vapor Effusion Cells," Institute for Energy Conversion, Univ. of Delaware, July 7, 2000.
4. L.L. Raja, "Modeling of Coupled Plasma-Sheath-Bias Circuit Interaction Phenomena in High-Density Plasma Reactors," (Host Prof. David G. Goodwin) Mechanical Engineering Seminar, California Institute of Technology, Pasadena, CA, Mar. 9, 2001.
5. L.L. Raja, "SAHA: One-Dimensional Modeling of Semiconductor Plasma Process Reactors," Toshiba Corporate R&D Center, Toshiba Corporation, Kawasaki, Japan, Dec. 17, 2002.
6. L.L. Raja, "Modeling of High-Pressure, Non-Equilibrium Glow Discharge Phenomena," (Host Prof. Roger Bengston) Dept. of Physics, Fusion Research Center, The University of Texas at Austin, Austin, TX, Jan. 24, 2003.
7. L.L. Raja, "Computational and Experimental Studies of Helium Dielectric-Barrier Controlled Atmospheric-Pressure Glow Discharges," (Host Prof. dr.ir. M.C.M. van de Sanden) Dept. of Applied Physics, Technical University/Eindhoven, Eindhoven, The Netherlands, Mar. 13, 2003.
8. L.L. Raja, "The Dynamics of Large-Volume Atmospheric-Pressure Glow Discharges," (Center for Advanced Technology, Department of Atomic Energy, GOI, Indore, India, July 29, 2003.
9. **(Plenary Talk)** L.L. Raja, "The Dynamics and Chemistry of Large-Volume Atmospheric-Pressure Glow Discharges," (Hosted by Prof. A. Kobayashi, Symposium chairman) 4th International Symposium on Applied Plasma Science, Kyoto, Japan, Sept. 1-5, 2003.
10. L.L. Raja, "Modeling of Low-Temperature Plasmas for Materials Processing and Space Propulsion Applications," ITN Energy Systems Inc., Morrison, CO, Nov. 10, 2004.
11. L. L. Raja, "Simulation of Direct-Current Microdischarges for Small-Satellite Micropropulsion Applications," Mechanical and Aerospace Engineering Department Colloquium, Cornell University, Ithaca, NY, Nov. 22, 2005.
12. **(Plenary Talk)** L. L. Raja, "Simulation of direct-current microdischarges for application in electro-thermal class of small satellite propulsion devices," 3rd International Workshop on Microplasmas, Griefswald, Germany, May 9-11, 2006.
13. L. L. Raja, "Physics of microdischarges and their applications in aerospace engineering," Gordon Research Conference on Plasma Processing Science, Mount Holyoke College, South Hadley, MA, July 16-21, 2006.
14. L.L. Raja, "Studies of direct-current surface glow discharge actuator for high-speed glow control," Dept of Physics, The University of Texas at Austin, Feb 08, 2008.
15. L.L. Raja, "Studies of direct-current surface glow discharge actuator for high-speed glow control," Dept of Electrical and Computer Engineering, Old Dominion University, Norfolk, VA, April 04, 2008.
16. L. L. Raja, "Data needs for modeling non-equilibrium plasma discharges using the continuum (fluid) approach," Pre-conference Workshop: Advances in the Kinetic Description of Low-Temperature Plasmas: Applications to Modeling and Simulation, Saratoga Springs, New York, 19 Oct 2009.
17. L. L. Raja, "Microdischarge plasma thrusters for small satellite propulsion," Gaseous Electronics Conference, Saratoga Springs, NY, 20-23 Oct. 2009.

Regular Talks:

18. L.L. Raja* and Y.A. Hassan, "Comparison of the RELAP5/MOD3 and RELAP5/MOD2 Predictions of the Winfrith Post Dryout Experiment," 1991 Annual Meeting, American Nuclear Society, Orlando, FL, June 1991.
19. L.L. Raja*, and Y.A. Hassan, "Simulation of a Single U-tube Condensation Experiment in the Presence of Noncondensable Gases," 1991 Winter Meeting, American Nuclear Society, San Francisco, CA, Nov. 1991.

20. L.L. Raja*, and Y.A. Hassan, "Prediction of the MIT Steam Condensation Experiment in the Presence of Air," 1991 Winter Meeting, American Nuclear Society, San Francisco, CA, Nov. 1991.
21. L.L. Raja*, and Y.A. Hassan, "Simulation of Loss of RHR During Midloop Operations and the Role of Steam Generators in Decay Heat Removal," 1992 Winter Annual Meeting, American Nuclear Society, Chicago, IL, Nov. 1992.
22. L.L. Raja*, P.L. Varghese, and D.E. Wilson, "Modeling of the Electrothermal Ignitor Metal Vapor Plasma for Electrothermal-Chemical Guns," 8th EML Symposium on Electromagnetic Launch Technology, Baltimore, MD, Apr. 21-24, 1996.
23. L.L. Raja*, P.L. Varghese, and D.E. Wilson, "Modeling of the electrogun metal vapor plasma discharge," AIAA Paper 96-2327, 27th Plasmadynamics and Lasers Conference, New Orleans, LA, June 17-20, 1996.
24. J.M. Kohel*, L.K. Su, L.L. Raja, N.T. Clemens, and P.L. Varghese, "Experimental Characterization of a Pulsed Plasma Jet," AIAA Paper 98-0999, 36th Aerospace Sciences Meeting & Exhibit, Reno, NV, Jan. 12-15, 1998.
25. L.L. Raja*, "Stagnation Flows in Advanced Materials Processing and Combustion," Thermal/Fluid Systems Seminar Series, Mechanical Engineering Department, The University of Texas at Austin, Austin, TX, Feb. 20, 1998.
26. L.L. Raja*, "Development and Application of Chemically Reacting Flow Models in the Design and Control of Materials Processes," Engineering Division, Colorado School of Mines, Golden, CO, April 20, 1998.
27. L.L. Raja*, "Reduced Flow Modeling and Chemistries for Atmospheric Pressure Chemical-Vapor Deposition of Cadmium-Telluride Thin Films," ITN/Energy Systems, Wheatridge, CO, May 4, 1998.
28. L.L. Raja*, "Simulation of the Transient, Compressible, Gas-Dynamic, Behavior of Catalytic-Combustion Ignition in Stagnation Flows," 27th International Symposium on Combustion, Boulder, CO, Aug. 6, 1998.
29. L.L. Raja*, "Reactor Scale Modeling for MOCVD of YBCO Superconducting Thin Films," Courant Institute of Mathematical Sciences, New York University, NY, Oct. 5, 1998.
30. L.L. Raja*, "Reactor Scale Modeling for the Prediction and Control of Chemical Vapor Deposition Processes," Engineering Division, Colorado School of Mines, Golden, CO, Mar. 23, 1999.
31. L.L. Raja*, R.J. Kee, O. Deutschmann, J. Warnatz, and L.D. Schmidt, "A Critical Comparison of Navier-Stokes, Boundary-Layer, and Plug-Flow Model for the Simulation of Flow and Chemistry in a Catalytic Combustion Honeycomb Channel," 4th International Workshop on Catalytic Combustion, San Diego, CA, April 1999.
32. L.L. Raja*, E.A. Repetto, M. Gallivan, M. Jabbour, K. Bhattacharya, D.G. Goodwin, M. Ortiz, and R.J. Kee, "A Computational Simulation to Couple Reactor-Scale Performance with Microscale Surface Morphology in CVD Processes," 195th Meeting of the Electrochemical Society, Seattle, WA, May 1999.
33. H.G. Im*, L.L. Raja, and R.J. Kee, "A Numerical Study of Transient Ignition in Opposed Jet Flow Using Adaptive Time Integration," 17th International Colloquium on the Dynamics of Explosive and Reactive Systems, Heidelberg, Germany, July 25-30, 1999.
34. L.L. Raja*, "Catalytic Combustion Effort at the Center for Commercialization of Combustion in Space," CCACS Annual Meeting, Colorado School of Mines, Sept. 17, 1999.
35. D.G. Goodwin*, E.A. Repetto, B. Platt, M.A. Gallivan, M. Jabbour, K. Bhattacharya, M. Ortiz, L.L. Raja, and R.K. Kee, "A Modular Framework for Integrated Multiscale Modeling of Chemical Vapor Deposition," 2000 Spring Meeting, Materials Research Society, San Francisco, CA, April 24-28, 2000.
36. R.J. Kee*, L.L. Raja, and T.L. Vincent, "The Role of Computational Models in Designing Transient Optimal-Control Strategies for Thin Film Processing," 2000 Spring Meeting, Materials Research Society, San Francisco, CA, April 24-28, 2000.
37. A.B. Tripathi*, D.A. Boyd, M.A. Gallivan, H.A. Atwater, R.M. Murray, D.G. Goodwin, L.L. Raja, and R.J. Kee, "A Stagnation-Flow MOCVD Reactor for Intelligent Deposition of YBCO Thin Films, 15th International Symposium on Chemical Vapor Deposition, The Electrochemical Society, May 2000.
38. L.L. Raja*, "Multiscale Phenomena in High-Density Plasma Etching of VLSI and MEMS Microstructures," (interview talk) ASE/EM Seminar, University of Texas at Austin, Austin, TX, Sept. 10, 2001.
39. N. Sullivan*, L.L. Raja, R.J. Kee, Y. Yokota, and M. Williams, "Exploring the ISSG Parameter Space," 9th International Conference on Advanced Thermal Processing of Semiconductors (RTP 2001), Anchorage, AK, Sept. 25-29, 2001.
40. L.L. Raja* and E. Meeks, "A Fast Computational Model for Study of Coupled Bulk Plasma-Sheath-Bias Circuit Phenomena and its Effect on Plasma-Surface Interactions," 48th International Symposium, American Vacuum Society, San Francisco, CA, Oct. 28-Nov. 2, 2001.
41. T.L. Vincent* and L.L. Raja, "A Novel Approach for Control of High Density Plasma Process Parameters Through Optimal Pulse Shaping," 48th International Symposium, American Vacuum Society, San Francisco, CA, Oct. 28-Nov. 2, 2001.

42. X. Yuan* and L.L. Raja, "Modeling of Fundamental Processes in a Capacitively Coupled Helium Atmospheric-Pressure Glow Discharges, 48th International Symposium, American Vacuum Society, San Francisco, CA, Oct. 28-Nov. 2, 2001.
43. T. L. Vincent* and L.L. Raja, "Theory of Optimal Pulse Shaping for Plasma Processing," American Control Conference, Anchorage, AK, May 8-10, 2002.
44. P. Kothnur*, X. Yuan, L.L. Raja, "One-dimensional Simulation of Glow-Like Plasma Phenomena in Parallel-Plate Microdischarge Geometries," Gordon Research Conferences, Tilton School, NH, July 21-26, 2002.
45. P. Kothnur*, X. Yuan, and L.L. Raja, "One-Dimensional Simulation of Glow-Like Plasma Phenomena in Parallel-Plate Microdischarge Geometries," 49th International Symposium, American Vacuum Society, Denver, CO, Nov. 3-8, 2002.
46. X. Yuan*, and L.L. Raja, "Simulation of the Plasma Dynamics and Chemical Phenomena in Dielectric-Barrier Controlled Atmospheric-Pressure Glow Discharge," 49th International Symposium, American Vacuum Society, Denver, CO, Nov. 3-8, 2002.
47. G. Chen* and L. L. Raja, "One-dimensional Fluid Simulations of Low-Pressure, High-Frequency, Capacitively Coupled Plasma Discharges," 56th Gaseous Electronics Conference, San Francisco, CA, Oct. 21, 2003.
48. J. Shin* and L. L. Raja, "Dynamics of Pulse Phenomena in Helium Dielectric-Barrier Atmospheric Pressure Glow Discharges," 56th Gaseous Electronics Conference, San Francisco, CA, Oct. 21, 2003.
49. P. S. Kothnur* and L. L. Raja, "Two-Dimensional Simulation of the Structure of Direct-Current Microdischarges," 56th Gaseous Electronics Conference, San Francisco, CA, Oct. 21, 2003.
50. J. Shin*, P. L. Varghese, and L. L. Raja, "Transient Drift and Scatter Phenomena in Dielectric-Barrier Atmospheric Pressure Glow Discharge in Helium," 50th International Symposium, American Vacuum Society, Baltimore, MD, Nov. 5, 2003.
51. X. Yuan* and L. L. Raja, "Plasma Dynamics of Dielectric Barrier Controlled Atmospheric-Pressure Glow Discharge in Helium," 50th International Symposium, American Vacuum Society, Baltimore, MD, Nov. 5, 2003.
52. P. S. Kothnur* and L. L. Raja, "Two-Dimensional Simulation of the Structure of Direct-Current Microdischarges," 50th International Symposium, American Vacuum Society, Baltimore, MD, Nov. 5, 2003.
53. P. S. Kothnur* and L. L. Raja, "Two-Dimensional Simulation of the Structure of Direct-Current Microdischarges," 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 5-8, 2004.
54. J. Shin* and L. L. Raja, "Long Time-Scale Characteristics of Dielectric Barrier Atmospheric-Pressure Glow Discharges," 57th Gaseous Electronics Conference, Bunratty, Ireland, Sept. 26, 2004.
55. P. Kothnur and L. L. Raja*, "Two-Dimensional Simulation of the Interaction Between Bulk Flow and Plasma Dynamics in Direct-Current Microdischarges," 57th Gaseous Electronics Conference, Bunratty, Ireland, Sept. 29, 2004.
56. G. Chen*, L. L. Raja, A. V. Arefiev, and B. N. Breizman, "Monte Carlo Simulation of Electron Kinetics in Helicon Plasma Source," VASIMR Workshop, Houston, TX, May 19, 2005.
57. J. Shin* and L. L. Raja, "Microdischarge-Assisted Ignition Characteristics of Large-Volume Atmospheric-Pressure Glow Discharges," 17th International Symposium on Plasma Chemistry, Toronto, Canada, Aug. 7-12, 2005.
58. P. Kothnur and L. L. Raja*, "Two-Dimensional Simulations of Interactions Between Bulk Flow and Plasma Dynamics in Direct-Current Microdischarges," 17th International Symposium on Plasma Chemistry, Toronto, Canada, Aug. 7-12, 2005.
59. J. Shin* and L. L. Raja, "Microdischarge-Assisted Ignition of Large Volume Dielectric Barrier Atmospheric-Pressure Glow (DB-APG) Discharges," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
60. P. S. Kothnur and L. L. Raja*, "Simulation of Microdischarge Gas Heating in Electro-Thermal Class of Small Satellite Propulsion Devices," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
61. G. Chen*, L. L. Raja, A. Arefiev, B. Breizman, "Electron Kinetics in Helicon Discharges," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
62. T. Deconinck*, S. Mahadevan, L. L. Raja, "Simulations of Glow Discharge Phenomena for High-Speed Flow Control," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
63. J. Shin*, V. Narayanaswamy, L. L. Raja, and N. T. Clemens, "Study of a DC discharge for a Mach 3 supersonic flow actuation" Gordon Research Conference on Plasma Processing Science, Mount Holyoke College, South Hadley, MA, July 16-21, 2006.
64. G. Chen*, A. Arefiev, B. Breizman, C. Lee, L. L. Raja, R. Bengtson, "Radially localized helicon mode in helicon plasma sources," 59th Gaseous Electronics Conference, Columbus, Ohio, Oct. 11, 2006.

65. S. Yeldell, L. L. Raja*, and P. L. Varghese, "Experimental Studies of a Direct-Current Microdischarge Plasma Thruster," 59th Gaseous Electronics Conference, Columbus, Ohio, Oct. 11, 2006.
66. J. Shin*, V. Narayanaswamy, L. L. Raja, and N. T. Clemens, "Experimental and spectroscopic study of flow actuation phenomena using DC discharge at a Mach 3 flow," 59th Gaseous Electronics Conference, Columbus, Ohio, Oct. 10, 2006.
67. T. Deconinck*, S. Mahadevan, and L. L. Raja, "Simulations of nitrogen glow discharge phenomena for high-speed flow control," 59th Gaseous Electronics Conference, Columbus, Ohio, Oct. 10, 2006.
68. L. L. Raja*, "Direct-current surface discharges for plasma flow actuation at high-speeds," Plasma Simulation Workshop, US Air Force Academy, Colorado Springs, Colorado, Nov. 8, 2006.
69. V. Narayanaswamy, J. Shin, L. L. Raja, and N. Clemens, "Characterization of supersonic flow boundary layer in the presence of a DC glow plasma discharge actuator," 59th Meeting of the American Physical Society, Division of Fluid Dynamics, Tampa, Nov. 19-21, 2006.
70. J. Shin, V. Narayanaswamy, T. Deconinck, S. Mahadevan, N. T. Clemens and L. L. Raja, "Experimental and modeling studies of direct-current glow discharge phenomena using pin-like electrodes for high-speed aerodynamic flow actuation," 2007 Aerospace Thematic Workshop, Lake Como, Italy, May 27-June 1, 2007.
71. S. Mahadevan, and L. L. Raja, "Simulations of direct-current air glow discharge phenomena," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
72. J. Shin, N. T. Clemens, and L. L. Raja, "Experimental study of plasma induced flow actuation by direct-current discharge," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
73. T. Deconinck and L. L. Raja, "Simulation studies of direct-current microdischarges for electrostatic mode microelectric propulsion," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
74. K.C. Utsav, J. Bingaman, P. L. Varghese, and L. L. Raja, "Experimental studies of a microdischarge plasma thruster in a tri-electrode configuration," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
75. K. C. Utsav, P. L. Varghese, and L. L. Raja, "Experimental Studies of a Microdischarge Plasma Thruster in a Tri-electrode Configuration," 4th International Workshop on Microplasmas, Tainan, Taiwan, Oct. 29, 2007.
76. T. Deconinck* and L. L. Raja, "Modeling of mode transition behavior in argon microhollow cathode discharges," Gordon Research Conference on Plasma Processing Science, Mount Holyoke College, South Hadley, MA, July 13-18, 2008.
77. T. Deconinck* and L. L. Raja, "Modeling of mode transition behavior in argon microhollow cathode discharges," 61th Gaseous Electronics Conference, Dallas, TX, Oct. 14-17, 2008.
78. S. Mahadevan* and L. L. Raja, "Simulations of direct-current glow discharges in supersonic air flow," 61th Gaseous Electronics Conference, Dallas, TX, Oct. 14-17, 2008.
79. S. Mahadevan* and L. L. Raja, "Electrode Polarity Effects in Direct Current Glow Discharges for Supersonic Flow Control," Gaseous Electronics Conference, Saratoga Springs, NY, Oct. 20-23, 2009.
80. D. Breden* and L. L. Raja, "Simulations of Thermal Phenomena in Nanosecond Pulsed Plasma Discharged in Supersonic Flows," Gaseous Electronics Conference, Saratoga Springs, NY, Oct. 20-23, 2009.

PATENTS/COPYRIGHTED SOFTWARE:

L. L. Raja and K. Roy, "Approach for surface functionalization of polymer biomaterials using atmospheric pressure glow discharges," provisional patent issued in July 2005 through the University of Texas at Austin- Office of Technology Licensing.

RESEARCH TOPICS

1. Fully coupled modeling for surface plasma discharge actuator interactions with high-speed aerodynamic flows
2. Computational modeling of RF activated microdischarge based small thrusters
3. Computational studies of micron and submicron scale plasma discharges including field emission effects
4. Computational modeling nanosecond pulsed discharges for plasma ignition of combustion
5. Computational modeling of capacitively coupled plasma discharge for pulsed atomic layer deposition

GRANTS AND CONTRACTS

(Note: PI – Principal Investigator, Co-PI – co-Principal Investigator)

Colorado School of Mines

1. (Co-PI), "Modeling the Thermal and Gas Dynamic Behavior of High-Rate Evaporation Boats for Thin-Film Deposition Processes," with R. J. Kee, and J. P. Delplanque, Global Solar Energy, Tuscon, AZ, DoD

- subcontract, Contract Number: 70NANBOH3025, total \$29,669, Raja's share \$10,000 estimate, 1/1/00 – 1/31/00.
2. (Co-PI), "A Feasibility Study of Plasma Sulfurization/Selenization for CIGS Photovoltaic Thin Films," with C. A. Wolden, ITN Energy Systems (NIST-ATP Subcontract), total \$116,000, Raja's share \$58,000 estimate, 3/01/00 – 2/28/01.
 3. (PI), "Development of Compact Plasma Models for Microelectronics Applications," Toshiba Corporate R&D Center, Toshiba Semiconductor Company, \$50,000, 3/1/00 – 5/31/01.
 4. (Co-PI), "Analysis of High-Rate Effusion Sources," with R. J. Kee, and J. P. Delplanque, Global Solar Energy, Tuscon, AZ, total \$153,275, Raja's share \$50,000 estimate, 7/1/00 – 12/31/01.
 5. (Co-PI), "Palm Power: Development of Compact Solid-Oxide Fuel Cells," DARPA (sub-contract), collaboration between ITN Energy Systems, University of Virginia, Mesoscale Devices, Inc., Penn State University, and Colorado School of Mines, total \$310,000, Raja's share \$50,000 estimate, 8/15/00 – 8/14/01.
 6. (Co-PI), "Modeling and Experimental Investigation of the ISSG Process," with R. J. Kee, C. A. Wolden, and T. J. McKinnon, Applied Materials, Santa Clara, CA, total \$210,266, Raja's share \$40,000 estimate, 8/15/00 – 8/14/01.
 7. (Co-PI), "Integrated Planar Solid-Oxide Fuel Cell Development," NIST-ATP (sub-contract), collaboration between ITN Energy Systems, University of Colorado Boulder, INEEL Idaho, and Colorado School of Mines, total \$304,360, Raja's share \$100,000 estimate, 9/1/00 – 8/31/03.
 8. (PI), "Development of a Comprehensive 1-Dimensional Model for Simulation of High-Density and Capacitively Coupled Plasma Reactors," Toshiba Corporate R&D Center, Toshiba Semiconductor Company, \$50,000, 7/1/01 – 3/31/02.

The University of Texas at Austin

1. (PI), "Fundamental Investigations of Atmospheric-Pressure Glow Discharges," National Science Foundation (CAREER Award), Contract Number: CTS 0221557, \$400,000 total, [Raja's share \$400,000 (\$320,916 at UT and \$79,084 at Colorado School of Mines)], 3/1/02 – 2/28/06.
2. (PI), "Development of Novel Microdischarge-Assisted Atmospheric Pressure Glow Discharge," Research Grant, The Office of the Vice President for Research, The University of Texas at Austin, total \$6,000 (no overhead), [Raja's share \$ 6,000], 12/1/02 – 08/31/03.
3. (PI), "Computational Study of Novel Microdischarge Thrusters for Nanosatellite Propulsion," 2003 Summer Research Grant (Faculty Development Program), The Office of the Vice President and Dean of Graduate Studies, The University of Texas at Austin, 2 mo. summer salary, total \$17,000 (no overhead), [Raja's share \$17,000], 06/1/03 – 07/31/03.
4. (PI), "Computational Investigations of Novel Microglow Discharges for Potential Nanosatellite Thruster Applications," Air Force Office of Scientific Research (AFOSR), Contract Number: F46620-03-1-0073, total \$232,110, [Raja's share \$232,110], \$74,900, 2/1/03 – 1/31/04; \$76,970, 2/1/04 – 1/30/05; \$80,240, 2/1/05 – 1/30/06.
5. (Co-PI), "Formation Autonomy Spacecraft with Thrust, Relnav, Attitude, and Crosslink (FASTRAC)," United States Air Force/NASA, total \$ 100,000, [Raja's share \$15,000], 04/01/03 – 03/31/05.
6. (Co-PI), "Experimental/Computational Studies of Combined-Cycle Propulsion: Physics and Transient Phenomena in Inlets and Scramjet Combustors," Air Force Office of Scientific Research (AFOSR) Multidisciplinary University Research Initiative (MURI) program, Contract Number: FA 9550-04-1-0387, total \$ 5,000,000, [Raja's share \$625,000], 06/01/04 – 05/31/09.
7. (PI), "SGER: Exploratory Studies of Atmospheric-Pressure Glow Plasma Processing of Bio-Degradable Polymer Particles," with Prof. K. Roy, National Science Foundation (NSF), Contract Number: CTS 0511817, total \$30,315, [Raja's share, \$15,000], 09/01/05 – 07/31/06.
8. (PI), "Studies of Microdischarge Plasma Thrusters (MPT) for nanosatellite propulsion," with Prof. P.L. Varghese, Air Force Office of Scientific Research, Contract Number: FA9550-06-1-0176, total \$ 330,000, [Raja's share \$ 165,000], 2/1/2006 – 11/30/2008.
9. (co-PI) "Studies of Helicon Discharge for VASIMR Thruster," with Prof. R. Bengtson (Physics) and Dr. B. Breizman (FRC, Physics), Ad Astra Rocket Company, \$150,000, [Raja's share \$ 50,000], 01/01/06-12/31/06.
10. (co-PI) "Studies of Helicon Discharge for VASIMR Thruster," with Prof. R. Bengtson (Physics) and Dr. B. Breizman (FRC, Physics), Ad Astra Rocket Company, \$250,000, [Raja's share \$ 80,000], 01/01/07-12/31/07.
11. (PI) "Simulation Studies of Railgun Contact Gap Plasmas," Institute of Advanced Technology, The University of Texas at Austin, ONR-MURI subcontract, \$ 115,000, [Raja's share \$ 115,000], 04/01/07 – 08/31/09.

12. (PI) "Collaborative Research: A Diagnostic and Modeling Investigation of Pulsed PECVD," National Science Foundation, Contract Number: CBET 0829003 \$ 227,697, [Raja's share \$ 227,697], 08/01/08 – 07/30/11.
13. (PI) "Computational Study of MicroCavity Plasma Thrusters," Air Force Office of Scientific Research, Contract Number: total \$ 75,005, [Raja's share \$ 75,005], 03/01/2009 – 11/30/2009.
14. (PI) "Participant support for 2008 Gaseous Electronics Conference," Air Force Office of Scientific Research, Contract Number: FA 9550-08-1-0360, total \$ 6,000 [Raja's share \$0], 08/01/08 – 11/30/08.
15. (PI) "Participant support for 2009 Gaseous Electronics Conference," National Science Foundation, Contract Number: CBET 0946014, total \$ 15,000 [Raja's share \$0], 09/01/09 – 11/30/09.
- 16.

M.S. SUPERVISION COMPLETED:

1. Morrison, Brandon, "Direct Simulation Monte Carlo modeling of effusion source vapor plumes used in thin-film deposition processes" M.S. Thesis, Colorado School of Mines, June 2002.
2. Jichul Shin, "Experimental study of pulse-phenomena in helium dielectric-barrier atmospheric pressure glow discharge", MSE Thesis, The University of Texas at Austin, Dec. 2003.
3. Stephen Yeldell, "Experimental studies of a novel microdischarge plasma thruster" MSE Thesis, The University of Texas at Austin, Aug. 2006.
4. Shankar Mahadevan, "Simulation of supersonic flow phenomena in the presence of direct-current surface plasma actuators" MSE Thesis, The University of Texas at Austin, Dec. 2006.

PH.D. SUPERVISION COMPLETED:

1. Xiaohui Yuan, "One-dimensional simulation study of atmospheric-pressure glow discharges", Ph.D. Dissertation, Colorado School of Mines, Dec. 2005.
2. Prashanth Kothnur, "Simulation of Direct Current Microdischarges for Microthruster Applications" Ph. D. Dissertation, The University of Texas at Austin, Dec. 2006.
3. Jichul Shin, "A study of direct-current surface discharge plasma for a Mach 3 supersonic flow actuation," Ph.D Dissertation, The University of Texas at Austin, Aug. 2007.
4. Guangye Chen, "Particle modeling of the VASIMR propulsion helicon discharge," Ph.D Dissertation, The University of Texas at Austin, Aug. 2008.
5. Thomas Deconinck, "Simulation studies of direct-current microdischarges for electric propulsion," Ph.D Dissertation, The University of Texas at Austin, Dec. 2008.
6. Daniel F. Berisford, "Thermal phenomena and power balance in a helicon plasma," Ph. D Dissertation, The University of Texas at Austin, May 2009.

PH.D. SUPERVISION IN PROGRESS:

Shankar Mahadevan
 Marshall Albright
 Hariswaran Sitaraman
 Doug Breden

OTHER STUDENT RESEARCH COMMITTEES (Current)

Ph.D. Committees - 4
 M.S. Committees - 2

OTHER RESEARCH SUPERVISION

Mohit Garg, Undergraduate Research Assistant, 2002-03
 Stephen Yeldell, Undergraduate Research Assistant, 2003-04
 Romil Doctor, Undergraduate Research Assistant, 2003-04
 Divya Thakur, Undergraduate Research Assistant, 2003-04

Laxminarayan L. Raja, Associate Professor

The University of Texas at Austin
Department of Aerospace Engineering
and Engineering Mechanics

Dr. Raja is an Associate Professor in the Department of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin. He holds the Robert and Francis Stark Centennial Fellowship in Engineering at the Cockrell College of Engineering, The University of Texas at Austin. He has a Ph.D in Mechanical Engineering, M.S. in Nuclear Engineering, and a B. Tech in Aerospace Engineering.

Dr. Raja's research is in the area of low-temperature, non-equilibrium, plasmas. His research emphasizes both fundamental studies of plasma phenomena and the study of plasma applications in materials processing and spacecraft electric propulsion. Current research topics include 1) large-volume high-pressure glow discharges, 2) microdischarges, 3) semiconductor-process plasmas, 4) spacecraft propulsion, and 5) modeling studies of railgun contact gap plasmas. The above research is conducted primarily through computational modeling involving multidimensional chemically reactive plasma models and particle models currently being developed by Dr. Raja's group. His research is currently funded by the National Science Foundation (NSF), Air Force Office of Scientific Research (AFOSR), and the Institute of Advanced Technology, UT-Austin.

Dr. Raja teaches in the area of fluid mechanics and plasma dynamics and has taught undergraduate and graduate classes in these areas at The University of Texas at Austin.

Dr. Raja received the prestigious National Science Foundation CAREER award in 2001.