

## **Mark Gilmore**

*Associate Professor*

Electrical and Computer Engineering and  
Physics and Astronomy Departments  
University of New Mexico, Albuquerque, NM 87131, USA  
[gilmore@ece.unm.edu](mailto:gilmore@ece.unm.edu)

### **Education**

Ph.D., Electrical Engineering (Applied Plasma Physics), University of California, Los Angeles, 1999

M.S., Electrical Engineering, Northeastern University, Boston, MA, 1992

B.S., Electrical Engineering, Boston University, Boston MA, 1986

### **Appointments**

Associate Professor, University of New Mexico Electrical and Computer Engineering, and Physics and Astronomy Departments, July 2009 to present.

Assistant Professor, University of New Mexico Electrical and Computer Engineering Dept., Jan. 2003 to June 2009.

Lecturer, UCLA Electrical Engineering Dept., Spring 2001 – Spring 2002

Assistant Research Scientist, UCLA Electrical Engineering Dept., July 1999 to Dec. 2002.

Graduate Student Researcher, UCLA Electrical Engineering Dept., 1992-June, 1999.

Graduate Research Assistant, Northeastern University Dept. of Electrical and Computer Engineering, Boston, MA, 1990-1992.

Associate Research Engineer, Delphax Systems (a Xerox company), Canton, MA, 1986-1990.

## **I. Research**

### **Current Research Interests**

Plasma Diagnostics

Turbulence and Transport in Plasmas

Magnetic and Magneto-Inertial Fusion Energy

High Energy Density Physics

Plasma Physics of High Power Microwave Devices

### **Journal Publications**

#### **A. In Preparation**

1. S. Xie, M. Gilmore, C. Watts, and L. Yan. "Observation of Chaos in Magnetized Laboratory Plasma under the Influence of Variable Biasing". To be submitted to *Chaos*.

#### **B. Submitted and In Review**

None

### C. Published and Accepted for Publication

1. E. Merritt, A.G. Lynn, M. Gilmore, S.C. Hsu, “Multi-chord Interferometer for the Plasma Linear Experiment.” To be published in *Review of Scientific Instruments*. Number of times cited: 0.
2. C. Watts, M. Gilmore, and E. Schamiloglu. “Effects of Laser Surface Modification on Secondary Electron Emission of Copper”. *IEEE Transactions on Plasma Science* **39**(3), 836. Number of times cited: 0.
3. A.G. Lynn, E. Merritt, M. Gilmore, S.C. Hsu, F.D. Witherspoon, J.T. Cassibry and the PLX Team. “Diagnostics for the Plasma Liner Experiment.” *Review of Scientific Instruments* **81**, 10E115. Number of times cited: 2.
4. A. G. Lynn, M. Gilmore, C. Watts, J. Herrea, R. Kelly, S. Xie, L. Yan and Y. Zhang, “The HELCAT Dual-Source Plasma Device.” *Review of Scientific Instruments*. **80**, 103501, Oct. 2009. Number of times cited: 5.
5. P. Kumar, C. Watts, T. Svimonishvili, M. Gilmore, and E. Schamiloglu, “The Dose Effect in Secondary Electron Emission.” *IEEE Transactions on Plasma Science* **37**(8), 1537 – 1551. Number of times cited: 5.
6. J.P. Martin, M.E. Savage, T.D. Pointon, and M. Gilmore. “Tailoring of electron flow current in magnetically insulated transmission lines.” *Physical Review Special Topics: Accelerators and Beams*, **12**, 030401-1 – 030401-12, March, 2009. Number of times cited: 2.
7. R. Compeau, M. Gilmore, and C. Watts. “Triple probe signal detection electronics for systems lacking a well defined ground.” *Review of Scientific Instruments*, **79**(10), 10F128, October, 2008. Number of times cited: 1.
8. N.R. Devarapalli, A.G. Lynn, M. Gilmore, and M.E. Savage. “Design and implementation of a 120 GHz tracking interferometer with near diffraction limited focal spot.” *Review of Scientific Instruments*, **79**(9), 093509-1 - 093509-7, September, 2008. Number of times cited: 1.
9. T.P. Intrator, G.A. Wurden, P.E. Sieck, W.J. Wagenaar, R. Renneke, L. Dorf, M. Kostora, S.C. Hsu, A.G. Lynn, M. Gilmore, R.E. Siemon, *et al.* “Physics basis progress for a translating FRC for MTF,” *Journal of Fusion Energy* **27**(1), 57-60, June 2008. Number of times cited: 3.
10. T.L. Rhodes, W.A. Peebles, M.A. Van Zeeland, M. Gilmore, J.S. deGrassie, G.R. McKee, G.M. Staebler, J.C. DeBoo, *et al.*, “Broad wavenumber turbulence measurements during neutral beam injection on the DIII-D tokamak.” *Nuclear Fusion* **47**(8), 936-942, August 2007. Number of times cited: 5.
11. Daniel P. Jackson, Jr., Mark E. Savage, Clifford W. Mendel, Jr., and Mark A. Gilmore. “Ion Current Collection Diagnostic for Exploring Plasma Opening Switch Performance.” *IEEE Transactions on Plasma Science* **34**(5), 1900-1907, October, 2006. Number of times cited: 4.

12. N. Zamoski, P. Kumar, C. Watts, T. Svimonishvili, M. Gilmore, E. Schamiloglu, and J. Gaudet. "Experimental Setup and Secondary Electron Yield Measurements from Materials with Application to Collectors of High Power Microwave Devices." *IEEE Transactions on Plasma Science* **34**(3), 642-651, June, 2006. Number of times cited: 3.
13. S.M. Kaye, *et al.* (2005). "Progress toward high performance plasmas in the National Spherical Torus Experiment (NSTX)". *Nuclear Fusion* **45**(10), S168. Number of times cited: 57.
14. C.X. Yu, M. Gilmore, W.A. Peebles, and T.L. Rhodes (2003). "Structure Function Analysis of Long-Range Correlations in Plasma Turbulence". *Physics of Plasmas*, **10** (7), 2772-2779. Number of times cited: 40.
15. M. Gilmore, W.A. Peebles, S. Kubota, X.V. Nguyen, and A. Ejiri (2003). "Progress toward a practical magnetic field diagnostic for low-field fusion plasmas based on dual mode correlation reflectometry." *Review of Scientific Instruments* **74** (3), pt.2, 1469-1472. Number of times cited: 3.
16. E.J. Synakowski, M.G. Bell, R.E. Bell, T. Bigelow, M. Bitter, W. Blanchard, J. Boedo, C. Bourdelle, C. Bush, D.S. Darrow, *et al.* (2003). "The national spherical torus experiment (NSTX) research programme and progress towards high beta, long pulse operating scenarios." *Nuclear Fusion* **43** (12), 1653-1664. Number of times cited: 36.
17. D. Mueller, M. Ono, M.G. Bell, R.E. Bell, M. Bitter, C. Bourdelle, D.S. Darrow, P.C. Efthimion, E.D. Fredrickson, D.A. Gates, *et al.* (2003). "Results of NSTX heating experiments." *IEEE Transactions on Plasma Science* **31** (1), pt. 1, 60-67. Number of times cited: 3.
18. R. Maingi, M.G. Bell, R.E. Bell, J. Bialek, C. Bourdelle, C. Bush, D.S. Darrow, E.D. Fredrickson, D.A. Gates, M. Gilmore, *et al.* (2003). "Recent results from the national spherical torus experiment." *Plasma Physics and Controlled Fusion* **45** (5), 657-669. Number of times cited: 33.
19. M. Ono, M.G. Bell, R.E. Bell, T. Bigelow, M. Bitter, W. Blanchard, J. Boedo, C. Bourdelle, C. Bush, W. Choe, *et al.* (2003). "Progress towards high-performance, steady-state spherical torus." *Plasma Physics and Controlled Fusion* **45**(12A), A335-350. Number of times cited: 24.
20. M. Gilmore, C.X. Yu, T.L. Rhodes, and W.A. Peebles (2002). "Investigation of rescaled range analysis, the Hurst exponent, and long-time correlations in plasma turbulence". *Physics of Plasmas* **9**(4), 1312-1317. Number of times cited: 30.
21. P.A. Politzer, M.E. Austin, M. Gilmore, G.R. McKee, T.L. Rhodes, C.X. Yu, E.J. Doyle, T.E. Evans, R.A. Moyer (2002). "Characterization of avalanche-like events in a confined plasma." *Physics of Plasmas* **9** (5), pt.2, 1962-1969. Number of times cited: 14.

22. R.J. Taylor, J.-L. Gauvreau, M. Gilmore, P.-A. Gourdain, D.J. LaFonteese, and L.W. Schmitz (2002). "Initial plasma results from the Electric Tokamak". *Nuclear Fusion* **42**, 46-51. Number of times cited: 19.
23. M. Gilmore, W.A. Peebles, and X.V. Nguyen (2001). "Dual mode (ordinary-extraordinary) correlation reflectometry for magnetic field and turbulence measurements." *Review of Scientific Instruments* **72** (1), pt. 2, 293-300. Number of times cited: 16.
24. M. Gilmore, W.A. Peebles, and X.V. Nguyen (2000). "Investigation of dual mode (O-X) correlation reflectometry for determination of magnetic field strength". *Plasma Phys. Control. Fusion*, **42**, 655-668. Number of citations: 8.
25. M. Gilmore, W.A. Peebles, and X.V. Nguyen (2000). "Detailed comparison of plasma turbulence correlation length measurements using microwave reflectometry and a Langmuir probe array". *Plasma Phys. Control. Fusion* **42**, L1-L7. Number of times cited: 19. **This paper was one of the three most downloaded articles of *Plasma Physics and Controlled Fusion* in the year 2000.**
26. M. Gilmore, W.A. Peebles, and X.V. Nguyen (1999). "Development of a Local Internal Magnetic Field Measurement via Dual Mode (O,X) Correlation Reflectometry." *Review of Scientific Instruments* **70**(1), 1085-1088. Number of times cited: 6.
27. M. Gilmore (1998). "Engineering Applications of Plasma Science." *IEEE Potentials* **17**(3), 4-8. Number of times cited: 0.
28. T.L. Rhodes, W.A. Peebles, E.J. Doyle, P. Pribyl, M. Gilmore, R.A. Moyer, and R.D. Lehmer (1998). "The Effect of Amplitude Fluctuations on Reflectometer Measurement of Density Turbulence in Tokamaks." *Plasma Physics and Controlled Fusion* **40**, 493-510. Number of times cited: 29.
29. M. Gilmore, N.E. McGruer, J. Browning, and W.J. Bintz (1993). "Measurement of Gated Field Emitter Failures." *Review of Scientific Instruments* **64**(2), 581-582. Number of times cited: 3.
30. N.E. McGruer, J. Browning, S. Meassick, M. Gilmore, W.J. Bintz, and C. Chan (1993). "Ion-Space-Charge Initiation of Gated Field Emitter Failure." *J. Vacuum Science and Technology* **11** (2), 441-444. Number of times cited: 7.
31. J. Browning, N.E. McGruer, W.J. Bintz, M. Gilmore (1992). "Experimental observation of gated field emitter failures." *IEEE Trans. Electron Devices* **13** (3), 176-169. Number of times cited: 7.
32. J. Browning, N.E. McGruer, S. Meassick, C. Chan, W. Bintz, and M. Gilmore (1992). "Gated Field Emitter Failures: Experiment and Theory", *IEEE Transactions on Plasma Science* **20**(5), 499-506. Number of times cited: 11.

## Invited Talks

1. “Review of Recent Work on Collective Scattering to Measure High-k Fluctuations in Magnetic Confinement Fusion Devices,” Mark Gilmore. Presented at the 12<sup>th</sup> Laser Aided Plasma Diagnostics Conference, Sept 23 – 27, 2005, Snowbird, UT.
2. “Changes in Edge Turbulence with  $\rho^*$  and Toroidal Rotation Input in NSTX.” M. Gilmore, D. Stutman, S. Kubota, W.A. Peebles, X.V. Nguyen, and the NSTX Team. Presented at the 44<sup>th</sup> Annual American Physical Society Division of Plasma Physics Meeting, Orlando, FL, Nov. 11 – 15, 2002.
3. “Dual mode (ordinary-extraordinary) correlation reflectometry for magnetic field and turbulence measurements,” M. Gilmore, W.A. Peebles, and X.V. Nguyen. Presented at the 13<sup>th</sup> Topical Conference on High Temperature Plasma Diagnostics, June 18 – 22, 2000, Tucson, AZ.

## Grant Awards

1. “Diagnostics for a Laboratory Collisionless Shock Experiment,” PI: Mark Gilmore, Sponsor: Los Alamos National Laboratory, Dates: April 1, 2012 – March 31, 2015, Award amount: \$120,00
2. “Formation of Imploding Plasma Liners for HEDP and MIF Applications,” PI: M. Gilmore. Sponsor: U.S. D.o.E. Office of Science. Dates: Dec. 15, 2009 – Dec. 14, 2013. Award amount: \$513,000.
3. “Numerical and Experimental Investigation of Turbulent Transport Control via Shaping of Radial Plasma Flow Profiles,” PI: M. Gilmore. Sponsor: U.S. D.o.E. Office of Science. Dates: Sept. 1, 2009 – August 31, 2012. Award amount: \$120,000.
4. “Experimental and Computational Investigation of the Dynamics of Fluctuation Suppression by Controlled Flow Shear,” PI: M. Gilmore. Sponsor: National Science Foundation. Dates: Sept. 1, 2009 – May 31, 2012. Award amount: \$300,000.
5. “Development of Optimized Field-Reversed Configuration Plasma Formation Techniques for Magnetized Target Fusion,” PI: A. Lynn, co-PI: M. Gilmore. Sponsor: U.S. D.o.E. EpsCor. Dates: Sept. 1, 2009 – Aug. 31, 2012. Award amount: \$349,074.
6. “Imaging and Optical Spectroscopy Instrumentation for Investigating Surface Plasmas in High Power Microwave Sources.” PI: M. Gilmore, co-PI: E. Schamiloglu. Sponsor: Air Force Office of Scientific Research (DURIP). Dates: Aril 15, 2008 – April 14, 2009. Award amount: \$150,000.
7. “Implementation of a Visible Wavelength Interferometer and Ongoing Spectroscopic Measurements of Ion Temperature and Impurity Content in the LANL Magnetized Target Fusion Experiment”. PI: M. Gilmore. Sponsor: Los Alamos National Laboratory. Award Dates: June15, 2007 – Oct 30, 2007. Total award amount: \$30,000.

8. Technical Support of Studies of Gas Switch Laser Breakdown Channel Dynamics. PI: M. Gilmore. Award Dates: Oct. 1, 2007 – Sept. 30, 2008. Total award amount: \$20,000.
9. “Investigation of Intermittent Turbulence and Turbulent Structures in the Presence of Controlled Sheared Flows.” PI: M. Gilmore, co-PI: T.A. Carter (UCLA). Sponsor: U.S. Department of Energy Office of Science. Award Dates: August 1, 2006 – July 30, 2009. Total award amount: \$359,430.
10. “Spectroscopic Measurements of Ion Temperature, Impurity Content, and Plasma Rotation in the LANL Magnetized Target Fusion Experiment.” PI: M. Gilmore. Sponsor: Los Alamos National Laboratory. Award Dates: April 1, 2005 – Nov. 30, 2005. Total award amount: \$30,000.
11. “Characterization of the Plasma Source in the SNL Magnetically Controlled Triggered Plasma Opening Switch (2<sup>nd</sup> year).” PI: M. Gilmore. Sponsor: Sandia National Laboratories, SURP Program. Award Dates: Oct 1, 2005 – Sept 30, 2006. Total award amount: \$40,000.
12. “Characterization of the Plasma Source in the SNL Magnetically Controlled Triggered Plasma Opening Switch.” PI: M. Gilmore. Sponsor: Sandia National Laboratories, SURP Program. Award Dates: Oct 1, 2004 – Sept 30, 2005. Total award amount: \$40,000.
13. “Experimental Investigation of Active Feedback Control of Turbulent Transport in a Magnetized Plasma.” PI: M. Gilmore. Sponsor: U.S. Department of Energy Office of Science, Jr. Faculty Development Award. Award Dates: August 1, 2004 – July 30, 2007. Total award amount: \$486,344.
14. “Measurements of Secondary Electron Yield from Materials with Application to Depressed Collectors.” PI: E. Schamiloglu, co-PI: M. Gilmore. Sponsor: Air Force Office of Scientific Research. Award Dates: Jan. 6, 2005 – Dec. 31, 2008. Total award amount: \$545,000
15. “ICEPIC Modeling of Secondary Emission.” PI: M. Gilmore. Sponsor: Kirtland Air Force Research Laboratory. Award Dates: May 4, 2004 – Oct. 31, 2005. Total award amount: \$79,020.
16. “Measurements of Secondary Electron Yield .” PI: E. Schamiloglu, co-PI: M. Gilmore. Sponsor: Air Force Office of Scientific Research. Award Dates: Feb. 1, 2003 – Dec. 31, 2004. Total award amount: \$497,276.
17. “Collaborative Research on the Complex Dynamics of Turbulence and Structure in Magnetized Plasmas.” PI: M. Gilmore, Co-PI: W.A. Peebles (UCLA). Sponsor: National Science Foundation. Award Dates: Sept. 1, 2003 – Aug. 31, 2006. Total award amount: \$417,653.
18. “Plasma Opening Switch Program.” PI: M. Gilmore. Sponsor: Sandia National Laboratories. Award Dates: Nov. 5, 2003 – Oct. 1, 2004. Total award amount: \$19,971.

19. "Collaboration on Experimental Studies of Turbulence and Transport on the Electron, Ion, and Meso-Scales." PI: M. Gilmore. Sponsor: General Atomics, San Diego, CA. Award Dates: Feb. 25, 2004 – Sept. 30, 2004. Total award amount: \$40,000.
20. "Development of a Millimeter Wave Collective Thomson Backscattering Diagnostic of High-k Turbulence in the DIII-D Tokamak." PI: M. Gilmore. Sponsor: General Atomics, San Diego, CA. Award Dates: April 14, 2003 – Sept. 30, 2003. Total award amount: \$50,000.

Total funding to date: \$2,806,418 as PI; plus an additional \$1,391,350 as co-PI

## Patents

1. W.R. Buchan, R.A. Moore, W.C. Caley, and M.A. Gilmore, *Powder Transport, Fusing, and Imaging Apparatus*, US patent 5,012,291, issued April, 1991.

## II. Teaching

### Courses Taught at the University of New Mexico

		<b>Mean Course Evaluation Scores (ICES Scores, /6)</b>		
		<u>Instructor</u>	<u>Content</u>	<u>Overall</u>
Fall 2003	<i>Plasma Physics I</i> (ECE/Ch-NE/Physics 534)	5.1	5.3	5.1
Spring 2004	<i>Electrodynamics</i> (ECE 561)	5.2	5.0	5.0
Fall 2004	<i>Microwave Engineering</i> (ECE 460/560)	5.5	5.3	5.3
Spring 2005	<i>Experimental Techniques in Plasma Science</i> (ECE/Ch-NE 553L)*	5.7	5.4	5.2
Fall 2005	<i>Microwave Engineering</i> (ECE 460/560)	5.7	5.6	5.5
Spring 2006	<i>Circuit Analysis I</i> (ECE 203)	5.1	4.9	4.7
Fall 2006	<i>Microwave Engineering</i> (ECE 460/560)	5.3	5.2	5.0
Spring 2007	<i>Electrodynamics</i> (ECE 561)	5.4	4.9	5.1
Fall 2007	<i>Microwave Engineering</i> (ECE 460/560)	6.0	5.7	5.7
Spring 2008	<i>Advanced Topics in Electromagnetics: Scattering</i> (ECE 661)**	5.8	5.6	5.4

		<b>Course Evaluation Scores (Raw IDEA Scores, /5)</b>	
		<u>Instructor</u>	<u>Course</u>
Fall 2008	<i>Circuit Analysis II</i> (ECE 213)	4.9	4.7
Spring 2009	<i>Electrodynamics</i> (ECE 561)	4.5	4.1
Fall 2009	<i>Plasma Physics I</i> (Ch-NE/ECE/Physics 534)	5.0	4.8
Spring 2010	<i>Plasma Physics II</i> (Physics 535/ECE 595)	5.0	4.7
Fall 2010	<i>Advanced Topics in Electromagnetics: Scattering</i> (ECE 661)	4.7	4.2
Fall 2011	<i>Microwave Engineering</i> (ECE 460/560)	4.9	4.7
Spring 2012	<i>Applied Electronics</i> (ECE 595)**	Not yet available	

\* Re-developed course (i.e. all new course content and experiments were developed)

\*\* New Course

**Online course sections at the University of New Mexico:**

Fall 2006: *Microwave Engineering* (ECE 460/560)  
 Fall 2007 *Microwave Engineering* (ECE 460/560)  
 Fall 2011 *Microwave Engineering* (ECE 460/560)

**Other Courses Taught (at The University of California, Los Angeles (UCLA))**

Spring 2001 *Principles of Semiconductor Devices*, EE121B, UCLA Electrical Engineering Dept.  
 Winter 2002 *Introductory Microwave Circuits*, EE 163A, UCLA Electrical Engineering Dept.

**Teaching Laboratories Established at the University of New Mexico:**

1. Graduate Experimental Techniques in Plasma Science Laboratory
2. Undergraduate/Graduate Microwave Circuits Laboratory (with C. Christodoulou)
3. Graduate Applied Electronics Laboratory (with C.R. Compeau)

**Students Graduated (theses supervised)**

Ph.D.:

1. Jeremy Martin, May 2008. Ph.D. in Electrical Engineering. Thesis Title: *Precision Electron Flow Measurements in a Disk Transmission Line*. Jeremy now works at the Honeywell/DoE Kansas City Plant.

M.S.:

1. Nate Zamoski, May 2004. Thesis Title: *Effects of Surface Conditioning, Morphology, and Temperature on Secondary Electron Emission*. Nate is now at Sandia National Laboratories.
2. Dan Jackson, August, 2005. Thesis Title: *Design, Analysis, and Implementation of an Ion Collection Diagnostic for the Triggered Plasma Opening Switch*. Dan is currently works for an electromagnetic effects group at Boeing in Seattle, WA.
3. Steven Will, December, 2005. Thesis Title: *Design and Construction of the Active Control of Turbulent Transport (ACTT) Plasma Device*. Steve works for Novellus Systems, a Plasma processing company, in Portland , OR.
4. Naga Devarapali, December 2006. Thesis Title: *120 GHz Tracking Interferometer for the Triggered Plasma Opening Switch*. Naga is continuing at UNM with Prof. Christodoulou for his Ph.D.
5. Prashanth Kumar, December 2006. Thesis Title: *Characterization of the Dose Effect in Secondary Electron Emission*. Prashanth is continuing at UNM for his Ph.D.
6. Jacob Mendez, December 2006. Thesis Title: *Performance and Characterization of a Large Format Solid State Imager*. Jacob is now employed at the DAHRT Group at Los Alamos National Laboratory.

7. Waylon Clark, May 2007. MS in Optical Sciences. Thesis Title: *Analysis of a Laser Induced Plasma in High Pressure SF6 Gas for High-Voltage, High-Current Switching*. Waylon is now an Electrical/Process Engineer at Commercial Metals Company, Phoenix, AZ, working on arc processing for recycling of steel.
8. Janus Herrera, May 2008. M.S. in Electrical Engineering with a Manufacturing Option. Project Title: *Design and Construction of A Chemical Delivery System for Atmospheric Pressure Plasma Materials Processing and Development of an Anti-Static Treatment for Polypropylene*. Janus is now employed at Intel in Phoenix, AZ.
9. Steven Nelson, May 2010. M.S. in Electrical Engineering. Thesis title: *A Stochastic Ensemble Forecast Model for Geosynchronous Relativistic Electron Fluxes*. Steven is currently with the Air Force Space Weather Center of Excellence at the Air Force Research Laboratory.
10. Tiffany Hayes, December 2010. M.S. in Physics. Thesis title: *Flow Measurements in a Helicon Plasma Under Biasing*. Tiffany is currently pursuing her Ph.D. at UNM.
11. Chris Colson, August 2011. Thesis title: *PMN/PT and Rutile LAC Voltage Breakdown Dependency with Respect to Backfill Gas, Voltage Rates of Rise, and Pressure*. Chris is currently on staff at Sandia National Laboratories.
12. Kevin Davis, December, 2011. Thesis title: *Microwave Interferometer and Refractometer for the WB-8 Polywell Fusion Device*. Kevin is currently with Energy Matter Conversion Corp. in San Diego, CA.

### **Students Currently Supported (and thesis research supervised)**

Collin Adams (Ph.D., ECE Dept.)  
 Tiffany Hayes (Ph.D., ECE Dept.)  
 Ralph Kelly (Ph.D., ECE Dept.)  
 Elizabeth Merrit (Ph.D., Physics Dept.)  
 Shuangwei Xie (Ph.D., ECE Dept.)  
 Lincan Yan (Ph.D., ECE Dept.)  
 Yue Zhang (Ph.D., ECE Dept.)

### **Post-Doctoral Researchers Supported**

Dr. Alan Lynn (Ph.D. University of Texas, Austin, May 2004). Sept 2004 – Sept 2006. Alan is now a Research Assistant Professor in the UNM ECE Dept.

### **Visiting Graduate Students (Scholars) Mentored**

Luigi Pangioni, *Universita' di Roma, Tor Vergata*, Roma, Italy, Sept 2005 – July 2006.

### **Undergraduate Research Assistants Employed and Mentored**

Travis Brooks (Nuclear Engineering)  
 Marco Cueto  
 Luke Engvall

Janus Herrera  
 Jake Hollowell  
 Emil Kadlec  
 Dennis Kim  
 Ricardo Magallanes  
 Ryan Molecke  
 Jaksa Osinski (Physics)  
 Laurel Roberson  
 Andy Sanchez  
 Emilie Steinhoff (Chemistry)  
 Tyler Winkook (Math)

### **High School Students Mentored**

Joseph Krietenger, La Cueva High School, mentorship, Spring 2008  
 Grant Hielman, La Cueva High School, summer 2007 intern  
 Jaksa Osinski, Albuquerque Academy, summers 2007 and 2008 intern  
 Will Volock, Cibola High School and ABQ Career Enrichment Center, Summer 2005

### **Engineering Senior Projects Sponsored/Supervised**

1. Marco Cueto, William Barva, Yolanda Cerba, and Vilaiphone Philavong, “Plasma Turbulence Monitoring and Correlation System”. Fall 2006 – Spring 2007.
2. Ryan Clark, Deanna Gomez, Gwen Smith. “Accelerator grid and pulsed power supply for electron energy control in HelCat.” Fall 2008 – Spring 2009.
3. Dennis Kim, Orlando Ortega, Ian Wilcox, et al, “Electronics for the upgrade of 94 and 40 GHz interferometers to swept heterodyne configuration.” Fall 2008 – Spring 2009.
4. Geoffrey Biegel and Seth Romo, “Fast time response RF power meter.” Fall 2008 – Spring 2009.
5. Ricardo Magallanes, Mel Pablo, and Diana Tsui, “Internal Helicon Antenna for the HelCat Plasma Device.” Fall 2009 – Spring 2010.

### **Graduate Problems Courses Supervised**

Supervised 6 graduate problems courses (ECE 551) for Kim Nichols, Doug Brown, Rich Compeau, Ralph Kelly, Brian Stoltzfus, and Jacob Mendez.

## **III. Service**

### **Professional Service**

- Senior Editor for Plasma Diagnostics for *IEEE Transactions on Plasma Science*. June 2007 – present.
- Organizing Committee member, American Physical Society Division of Plasma Physics Annual Meeting, November, 2009, Atlanta, GA, USA.
- Elected to a three-year term on the executive committee of the *University Fusion Association*, beginning March 2008.
- Organizing Committee member, IEEE International Conference on Plasma Science, June, 2009, San Diego, CA, USA

- Short Course Organizer, “Diagnostics for High Density Plasmas and Pulsed Power Systems.” Combined IEEE International Conference on Plasma Science and International Pulsed Power Conference, June 17-22, 2007, Albuquerque, USA
- Organizing Committee member, IEEE International Conference on Plasma Science, June 4-8, 2006, Traverse City, MI, USA
- Elected member of the IEEE Plasma and Nuclear Sciences Society *Plasma Science and Applications* Executive Committee, 2005 – 2008.
- Organizing Committee member, International Pulsed Power Conference, June 13-17, 2005, Monterey, CA, USA
- Reviewed papers (approximately 20 papers from 2003 to present) for the following journals: *IEEE Transactions on Plasma Science, Physics of Plasmas, Plasma Physics and Controlled Fusion, Review of Scientific Instruments, Nuclear Fusion, IEEE Transactions on Signal Processing*
- Reviewed grant proposals for the *National Science Foundation, U.S. Department of Energy Office of Science, National Nuclear Security Agency, and the European Atomic Energy Agency (Euratom)*.
- Served on review panels for the National Science Foundation *Joint NSF-DOE program in Basic and Plasma Science* (Feb. 2004), and *Course, Curriculum, and Laboratory Improvement Program* (March, 2004).

#### **UNM ECE Department Service**

- Area chair for Applied Electromagnetics, Jan. 2003 to present
- Graduate Committee member, Jan. 2003 to Dec 2006 and Aug. 2008 to present
- Undergraduate Committee, Jan. 2007 to Dec. 2007
- Computer Use Committee member, August 2005 to August 2006
- ECE Space Committee (chair), August 2011 - present
- Search committee for the Fall 2006 SPCOMM faculty position
- Judge for IEEE student paper contest in 2004, 2005
- Participated in numerous ECE and SOE open house and recruiting events

#### **IV. Awards and Honors**

- UNM School of Engineering Jr. Faculty Outstanding Teaching Award, May 2009
- UNM ECE Dept. Research Award, August 2006
- UNM IEEE Student Branch “Professor of the Year” Award, May 2004.

#### **V. Additional Research**

##### **Conference Papers**

1. M. Gilmore, T.R. Hayes, S. Xie, and L. Yan. (2011). “Flow Profile Changes and Fluctuation Suppression in a Large Scale Helicon Plasma With Electrode Biasing.” Proceedings of the 38<sup>th</sup> European Physical Society Conference on Plasma Physics 27 June – 1 July, 2011, Strasbourg, France.

2. M. Gilmore, T.R. Hayes, C. Watts, S. Xie, and L. Yan (2010). "Sheared Flow and Fluctuation Dynamics Under Biasing in a Magnetized Laboratory Plasma." Proceedings of the 37<sup>th</sup> European Physical Society Division of Plasma Physics, Dublin, Ireland, June 21 – 25, 2010.
3. M. Gilmore, *et al.* (2010). "Diagnostics for the Plasma Liner Experiment." Proceedings of the International Conference on Plasma Diagnostics, Pont-à-Mousson, France, April 12-16, 2010.
4. M. Gilmore, T.R. Hayes, S. Xie, L. Yan, and C. Watts (2009). "Chaos, Intermittency, and Sheared Flow Dynamics Under Biasing and Boundary Condition Changes in a Magnetized Laboratory Plasma." Proceedings of the 36<sup>th</sup> European Physical Society Division of Plasma Physics, Sophia, Bulgaria, June 29 – July 3, 2009.
5. A.G. Lynn, Y. Zhang, S. C. Hsu, H. Li, W. Liu, M. Gilmore, C. Watts (2009). "Magnetic Bubble Expansion as an Experimental Model for Extra-Galactic Radio Lobes." Proceedings of the 36<sup>th</sup> European Physical Society Division of Plasma Physics, Sophia, Bulgaria, June 29 – July 3, 2009.
6. M. Gilmore, B. Stoltzfus, M.E. Savage, and W.T. Clarke (2009). "Measurement of the Effective Length of Laser-Plasma Channels in a Laser Triggered Gas Switch by Guided Microwave Backscattering IN SF<sub>6</sub> AND N<sub>2</sub>/SF<sub>6</sub>." Proceedings of the 2009 IEEE Pulsed Power Conference, Washington, DC, USA, June 29 – July 3, 2009.
7. A. G. Lynn, M. Gilmore, N. R. Devarapalli, M. E. Savage, B. S. Stoltzfus (2009). "Interferometric Measurements on a Triggered Plasma Opening Switch Source." Proceedings of the 2009 IEEE Pulsed Power Conference, Washington, DC, USA, June 29 – July 3, 2009.
8. Y. Zhang, A. G. Lynn, S. C. Hsu, M. Gilmore, C. Watts (2009). "Design of a Compact Coaxial Magnetized Plasma Gun for Magnetic Bubble Expansion Experiments." Proceedings of the 2009 IEEE Pulsed Power Conference, Washington, DC, USA, June 29 – July 3, 2009.
9. Jeremy P. Martin, Mark E. Savage, Timothy D. Pointon, Mark A. Gilmore (2007). "Precision Electron Flow Measurements in a Disk Transmission Line". Proceedings of the 2007 IEEE Pulsed Power Conference, Albuquerque, NM, USA, June 18 – 22, 2007.
10. W.T. Clark, M.E. Savage, D.E. Bliss, B.S. Stoltzfus, J.R. Woodworth, Mark Gilmore (2007). Analysis of a Laser Induced Plasma in High Pressure SF<sub>6</sub> Gas". Proceedings of the 2007 IEEE Pulsed Power Conference, Albuquerque, NM, USA, June 18 – 22, 2007.
11. A.G. Lynn, D.P. Jackson, M.A. Gilmore, M.E. Savage, R.A. Sharpe. *Initial Planning for Interferometry Measurements on Triggered Plasma Opening Switch Source*. Proceedings of the 12th International Symposium on Laser-Aided Plasma Diagnostics, Snowbird, UT, 2005.
12. D.P. Jackson, M.E. Savage, C.W. Mendel, D.B. Seidel, R.A. Sharpe, M.A. Gilmore, and A.G. Lynn. *Initial Design and Results from an Ion Current Collection Diagnostic for the*

*Triggered Plasma Opening Switch Experiment.* Proceedings of the 15th IEEE International Pulsed Power Conference, Monterey, CA, 2005.

13. A.G. Lynn, D.P. Jackson, M.A. Gilmore, M.E. Savage, R.A. Sharpe. *Initial Planning for Interferometry Measurements on Triggered Plasma Opening Switch Source.* Proceedings of the 15th IEEE International Pulsed Power Conference, Monterey, CA, 2005.
14. M. Gilmore, A. Ejiri, S. Kubota, W.A. Peebles, and X.V. Nguyen. *Correlation Reflectometry Measurements of Magnetic Field Strength and Turbulence in NSTX.* Proceedings of the 6th International Workshop on Reflectometry 5-7 May, 2003, General Atomics, San Diego, CA
15. W.A. Peebles, M.Gilmore, T.L. Rhodes, E.J. Doyle, S. Kubota, L.Zeng, G.Wang. *An assessment of reflectometry imaging.* Proceedings of the 6th International Workshop on Reflectometry 5-7 May, 2003, General Atomics, San Diego, CA.
16. M. Gilmore, E.J. Doyle, S. Kubota, X.V. Nguyen, W.A. Peebles, T.L. Rhodes, and L. Zeng. *Recent Reflectometry Results from the UCLA Plasma Diagnostics Group.* Presented at the Fifth Reflectometry Workshop, Toki, Gifu, Japan, 5-7 March 2001.

#### **Recent Contributed Conference Posters and Oral Presentations (last 3 years)**

1. *Development of an Internal Helicon Source for the TORPEX Simple Magnetized Torus,* M. Gilmore, I. Furno, P. Marmillod. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
2. *Progress in turbulence studies in the TORPEX Simple Magnetized Torus,* Ivo Furno, Ambrogio Fasoli, Alexandre Bovet, Mark Gilmore, Kyle Gustafson, Davoud Iraj, Benoit Labit, Diane Lancon, Joaquim Loizu, Paolo Ricci, Christian Theiler. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
3. *Results of Electrode Biasing on Flow and Turbulence Dynamics in a Large Scale Helicon Plasma,* Tiffany Hayes, Mark Gilmore, Shuangwei Xie, Lican Yan, Joaquim Loizu, Paolo Ricci. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
4. *Potential and Flow Profiles and Fluctuation Dynamics in a Large Scale Helicon Plasma With Electrode Biasing,* Alan Lynn, Shuangwei Xie, Tiffany Hayes, Mark Gilmore, Lincan Yan, Andrew Sanchez. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
5. *Optimal Azimuthal Velocity Profile Control by ExB Actuation in HELCAT,* Zeki Ilhan, Eugenio Schuster, Shuangwei Xie, Mark Gilmore, Andrew Ware. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
6. *Tuning and testing a one-dimensional transport model,* L. Jones, A.S. Ware, D. Brugger, M. Gilmore, E. Schuster. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.

7. *Overview of the Plasma Liner Experiment (PLX)*, S.C. Hsu, F.D. Witherspoon, J.T. Cassibry, M. Gilmore. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
8. *Interferometry Results from Initial Experiments on the Plasma Liner Experiment (PLX)*, Elizabeth Merritt, Alan Lynn, Mark Gilmore, Scott Hsu. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
9. *Construction of the Plasma Liner Experiment (PLX)*, C.S. Adams, T.J. Awe, J.P. Dunn, S.C. Hsu, J.S. Davis, D.S. Hanna, J.A. Schwartz, S. Brockington, D. van Doren, F.D. Witherspoon, E.C. Merritt, A.G. Lynn, M. Gilmore. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
10. *Development of MiniRailguns for the Plasma Liner Experiment (PLX)*, F.D. Witherspoon (HyperV Technologies Corp.) , S. Brockington, A. Case, S.J. Messer, L. Wu, R. Elton, S.C. Hsu, J.T. Cassibry, M. Gilmore. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
11. *Visible Spectroscopy on the Plasma Liner Experiment*, J.A. Schwartz, T.J. Awe, S.C. Hsu, E.C. Merritt, A.G. Lynn, M. Gilmore, S. Fuelling. Poster presentation at the 53<sup>rd</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 14 - 18, 2011, Salt Lake City, UT, USA.
12. *Understanding Flow Profiles in a Large Scale Helicon Plasma With Electrode Biasing*, M. Gilmore, T.R. Hayes, S. Xie, L. Yan, C. Watts. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.
13. *Development of a drift wave turbulence transport model for a linear plasma device*, D. Brugger, A.S. Ware, M. Gilmore, S. Xie, E. Schuster, Q. Wang. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.
14. *Investigation of Chaotic Fluctuations in a Linear Helicon Plasma under Changing Magnetic Field and Radial Electric Field*, Shuangwei Xie, Mark Gilmore, Christopher Watts, Tiffany Hayes, Lincan Yan. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.
15. *Emissive Probe in the HelCat Linear Plasma Device*, R. Magallanes, A. Sanchez, R. Compeau, M. Gilmore. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.
16. *Non-Model-Based Optimal Fluctuation Mitigation by ExB Actuation in HELCAT*, Qiaoqiao Wang, Eugenio Schuster, Shuangwei Xie, Mark Gilmore, Andrew Ware. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.

17. *Diagnostics for the Plasma Liner Experiment (PLX)*, Elizabeth Merritt, Mark Gilmore, Alan Lynn, Bruno Bauer, F. Douglas Witherspoon, Jason Cassibry, Scott Hsu. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.
18. *Overview of Plasma Guns for PLX*, F. Douglas Witherspoon, Richard Bomgardner, Andrew Case, Sarah Messer, Samuel Brockington, Linchun Wu, Raymond Elton, Scott Hsu, Jason Cassibry, Mark Gilmore. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.
19. *Overview, Status, and Plans of the Plasma Liner Experiment (PLX)*, S.C. Hsu, T.J. Awe, D.S. Hanna, J.S. Davis, F.D. Witherspoon, J.T. Cassibry, M. Gilmore, D.Q. Hwang. Poster presentation at the 52nd Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 8 - 12, 2010, Chicago, IL, USA.
20. *Single Jet Studies on the Plasma Liner Experiment*, Thomas Awe, Scott Hsu, Colin Adams, Joshua Davis, John Dunn, Jacob Schwartz, Elizabeth Merritt, Alan Lynn, Mark Gilmore, F. Douglas Witherspoon, Sam Brockington, David van Doren. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
21. *The Tendency of Plasma Liners Formed by Hypersonic Jets to Evolve Toward Good Spherical Symmetry During Implosion*, Jason Cassibry, Milos Stanic, Richard Hatcher, Scott Hsu, Doug Witherspoon, Mark Gilmore, Weiwei Luo. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
22. *Stability Analysis of Low Frequency Electrostatic Modes in a Large Scale Helicon Plasma in the Presence of Sheared Flows*. M. Gilmore, S. Xie, M. Light, L. Yan, C. Watts, and A.G. Lynn. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
23. *Parallel Shear and Turbulence*. T.R. Hayes, M. Gilmore, C. Watts, S. Xie, and L. Yan. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
24. *The HelCat Helicon-Cathode Device at UNM*. B. Cyrin, C. Watts, M. Gilmore, T.R. Hayes, R. Kelly, C. Leach, A. Lynn, A. Sanchez, S. Xie, L. Yan, and Y. Zhang. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.

25. *Spectral Diagnostics for the HelCat Helicon-Cathode Device*. C. Leach, J. Osinski, E. Schamiloglu, and C. Watts. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
26. *Nonlinear Dynamics under Applied Electric Fields at a Magnetized Laboratory Plasma Edge*. S. Xie, M. Gilmore, C. Watts, and L. Yan. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
27. *Overview of the Plasma Liner Experiment (PLX)*. S.C. Hsu, F.D. Witherspoon, M. Gilmore, J.T. Cassibry, and the PLX Team. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
28. *Diagnostics for the Plasma Liner Experiment*. E. Merritt, M. Gilmore, A. Lynn, S.C. Hsu, F.D. Witherspoon, J.T. Cassibry, and the PLX Team. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
29. *Magnetic Bubble Expansion Experimental Investigation Using a Compact Coaxial Magnetized Plasma Gun*. Y. Zhang, A. Lynn, S.C. Hsu, H. Li, W. Liu, M. Gilmore, and C. Watts. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
30. *Modeling of Turbulent Transport and Flow Generation in the HelCat Experiment*. A.S. Ware, M. Olsen, M. Breyfogle, M. Gilmore, and E. Schuster. Poster presentation at the 51<sup>st</sup> Annual Meeting of the American Physical Society Division of Plasma Physics, Nov. 2 - 6, 2009, Atlanta, GA, USA.
31. *Chaos, Intermittency, and Sheared Flow Dynamics Under Biasing and Boundary Condition Changes in a Magnetized Laboratory Plasma*. M. Gilmore, T.R. Hayes, S. Xie, L. Yan, and C. Watts. Contributed oral presentation at the 36<sup>th</sup> European Physical Society Division of Plasma Physics, Sophia, Bulgaria, June 29 – July 3, 2009.
32. *Magnetic Bubble Expansion as an Experimental Model for Extra-Galactic Radio Lobes*. A.G. Lynn, Y. Zhang, S. C. Hsu, H. Li, W. Liu, M. Gilmore, C. Watts. Poster presentation at the 36<sup>th</sup> European Physical Society Division of Plasma Physics, Sophia, Bulgaria, June 29 – July 3, 2009.
33. *Design of a Compact Coaxial Magnetized Plasma Gun for Magnetic Bubble Expansion Experiments*. Y. Zhang, A. G. Lynn, S. C. Hsu, M. Gilmore, C. Watts. Contributed oral presentation of the 2009 IEEE Pulsed Power Conference, Washington, DC, USA, June 29 – July 3, 2009.
34. *Measurement of the Effective Length of Laser-Plasma Channels for Triggered Gas Switches in SF<sub>6</sub> and N<sub>2</sub>/SF<sub>6</sub>*. M. Gilmore, B. Stoltzfus, M.E. Savage, W.T. Clark. Presentation at the 2009 IEEE International Conference on Plasma Science (ICOPS), May 31 – June 5, 2009, San Diego, CA, USA.