Karla Mossi

Curriculum Vitae

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# EDUCATION

**Ph.D. in Mechanical Engineering,** Old Dominion University, Norfolk, VA (May, 1998)

Dissertation Title: *"Thin-Layer Composite Ferroelectric Driver and Sensor Characterization with Application to Separation Flow Control"*

**M.S. in Mechanical Engineering,** Old Dominion University, Norfolk, VA (May, 1992)

Thesis Title: *"Characterization of Trailing Line Vortices"*

**B.S. in Mechanical Engineering,** Universidad Nacional Autonoma de Honduras (May, 1988)

Thesis Title: *"Fabrication of Briquettes Using Rice Husk"*

# APPOINTMENTS

***Associate Professor of Mechanical Engineering***

Virginia Commonwealth University Richmond, VA, July 2007–Present

***Assistant Professor of Mechanical Engineering***

Virginia Commonwealth University Richmond, VA, January 2001–June 2007

## *Consultant for Experimental Characterization Procedures*

ICASE, NASA Langley Research Center, March 2001–December 2002

***Director of Research and Development***

Face International Corporation, January 1999–November 2000

***Senior Engineer***

Face International Corporation, July 1996–December 1998

***Research Engineer***

NASA Langley Research Center, Summer 1996

***Lab Instructor***

Old Dominion University, August 1994–May 1996

**AWARDS**

* “*Student Section Advisor Award for District F*,” American Society of Mechanical Engineers, 2007
* *“Parents’ Award for Excellence in Undergraduate Teaching,”* Virginia Commonwealth University, School of Engineering, May 2007
* "*Outstanding Graduate Teaching Assistant Award for Laboratory Instruction*," Old Dominion University, 1995-96
* "S*pecial Doctoral Award*," Spring 1996
* "*Certificate of Appreciation (Academy Graduate Assistant)*," CHROME, 1996 Young PhD's in Aeronautics, March 30, 1996
* "*Graduate Teaching Assistantship*," Summer 1996, Fall 1995, Summer 1995
* "*Certificate of Appreciation*," I. C. Norcom High School, Science Fair, March 1995, March 1994
* "*Certificate of Excellence*," CHROME, 1994 Young PhD's Program, November 1994.

**SELECTED RELATED PUBLICATIONS**

# Journal Papers

1. Mane, P., Xie, J., Mossi, K., Leang, K. (2010) “Cyclic Energy Harvesting from Pyroelectric Materials.” *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control*, in press.
2. Mane, P., Richeson, M., Mossi, K. (2010) “Energy Harvesting from Synthetic Jet Actuators.” *Smart Materials Journal*, submitted.
3. Xie, J., Mane, P., Green, C., Mossi, K., Leang, K. (2010) “Performance of Thin Piezoelectric Materials for Pyroelectric Energy Harvesting.” *Journal of Intelligent Materials Systems and Structures*, **21**(3), 423 –429.
4. Mane, P., Mossi, K., Green, C. (2009) “Optimizing Energy Harvesting Parameters using Response Surface Methodology.” IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control, 56(3), 429 – 436.
5. Mane, P., Mossi, K. and Bryant, R. (2008). “Piezoelectric Synthetic Jets in Quiescent Air: Experimental Design and Analysis.” Smart Materials and Structures, 17(1), (12pp).
6. Mane, P., Mossi, K., Rostami, A., Bryant, R. and Castro, N. (2007). “Piezoelectric actuators as synthetic jets: Cavity dimension effects.” Journal of Intelligent Materials Systems and Structures, 18(11), 221–232.
7. Mossi, K., Mouhli, M., Mane, P., Smith, B., and Bryant, R. (2006). “Shape modeling and validation of stressed biased piezoelectric actuators.” Smart Materials and Structures, 15 (2006) 1785–1793.
8. David, J., Castle, S., and Mossi, K. (2006) “Localization Tattoos: An Alternative Method Using Fluorescent Inks.” Radiation Therapist, 15(1), 1–5.
9. Mossi, K., Bryant, R., and Mane, P. (2005). "Piezoelectric composites as bender actuators." Integrated Ferroelectrics, 71, 221–232.

# Mossi, K., Castro, N. D., Bryant, R., and Mane, P. (2005). "Boundary condition effects on piezo-synthetic jets." Integrated Ferroelectrics, 71, 257–266.

# Bryant, R. G., Mossi, K. M., Robbins, J. A., and Bathel, B. F. (2005). "The correlation of electrical properties of prestressed unimorphs as a function of mechanical strain and displacement." Integrated Ferroelectrics, 71, 267–287.

# Mossi, K., Green, C., Ounaies, Z., and Hughes, E. (2005). "Harvesting energy using a thin unimorph prestressed bender: Geometrical effects." Journal of Intelligent Material Systems and Structures, 16(3), 249–261.

# Neiderer, K., Castle, S., Mossi, K., and Dempsey, T. (2005) “Lateral Scatter Effects on Dose Due to a Metal Prosthesis.” Radiation Therapist, 14(1), 51–54.

# Mossi, K., and Bryant, R. (2004) “Pre-stressed circular actuators.” Ceramic Transactions, 150, 445–454.

# Mossi, K., Selby, G., and Bryant, R. (1998) “Thin-Layer Composite Unimorph Ferroelectric Driver and Sensor Properties.” Materials Letters, 35, 39–49.

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# Conference Papers

1. Vijaywargi, V., Proffitt, R., Mane, P., Mossi, K., Ward, K., Lenhardt, M. (2009) “PVDF Sensor: Design and Development for Use as Intracranial Pressure Monitoring Device.” Proceedings of the ASME-SMASIS Conference, Oxnard-CA, USA.
2. Atulasimha, J., Xie, J., Richeson, M., Mossi, K. (2009) “Pyroelectric Materials: Scaling of Output Power with Dimensions and Substrate Clamping.” Proceedings of the ASME-SMASIS Conference, Oxnard-CA, USA.
3. Xie, J., Mane, P., Mossi, K., Leang, K. (2009) “Harveting Energy from Cyclic Temperature using pyroelectric effect.” Proceeding of SPIE International Society for Optics Engineering, San Diego-CA.Xie, J., Mane, P., Green, C., Mossi, K., Leang, K. (2008) “Pyroelectric Energy Harvesting from PZT.” Proceedings of the ASME-SMASIS Conference, Ellicott City-MD, USA.
4. Smith, B., Goo, N., Mossi, K. (2007) “Experimental development of power consumption in LIPCA-C2.” Proceedings of the SPIE International Society for Optics Engineering, 6526.
5. Mane, P., Mossi, K., Green, C., and Bryant, R. (2007) “Studying the effects of temperature on energy harvesting using pre-stressed piezoelectric diaphragms.” Proceeding of the SPIE International Society for Optics Engineering, 6526-18.
6. 3. Noras, M., Kieres, J., Mossi, K., and Leang, K. (2006) “The design of a high-voltage charge-feedback piezoamplifier.” Actuator, Bremen, Germany.

# 4. Maddox, J., Mane, P., Mossi, K., and Bryant, R. (2006) “Piezoelectric synthetic jets as virtual surfaces.” Actuator, Bremen, Germany.

# 5. Beck, J., Noras, M., Kieres, J., Speich, J., Mossi, K., and Leang, K. (2006) “Hysteresis characterization using charge-feedback control for a LIPCA device.” Proceeding of the SPIE International Society for Optics Engineering, 6170, 424–433.

# 6. Mane, P., Mossi, K., and Bryant, R. (2006) “Experimental design and analysis of bimorphs as synthetic jet diaphragms.” ASME Proceedings of IMECE06, ASME International Mechanical Engineering Congress and Exposition, Chicago - Illinois, USA, IMECE2006-14051.

# 7. Green, C., Mossi, K., and Bryant, R. (2005) “Scavenging energy from piezoelectric materials for wireless sensor applications.” ASME Proceedings of IMECE05, ASME International Mechanical Engineering Congress and Exposition, Orlando - Florida, USA, IMECE2005-80426.

# 8. Mane, P., Mossi, K., and Bryant, R. (2005) “Pressure loading of piezo composite Unimorphs.” Materials and Devices for Smart Systems II Proceedings 888, Material Research Society Fall Meeting, Boston-Massachusetts, USA, 0888-V01-06.

# 9. Mossi, K., Smith, B., Mouhli, M., and Bryant, R. (2005) “Characteristics of carbon reinforced piezoelectric composites.” ICEST Conference, Seoul, Korea.

# 10. Mane, P., Mossi, K., and Bryant, R. (2005) “Synthetic jets with piezoelectric diaphragms.” Proceeding of the SPIE International Society for Optics Engineering, 5761, 233–243.

# 11. Mossi, K., Mane, P., and Bryant, R. (2005) “Velocity profiles for synthetic jets using piezoelectric circular actuators.” 46th AIAA/ASME/ASCE/AHS/ASC Structures Structural Dynamics and Materials Conference, Austin - Texas, USA, AIAA-2005-2341.

# 12. Mossi, K., and Bryant, R. (2004) “Characterization of piezoelectric actuators for flow control over a wing actuator,” Actuator, Bremen, Germany, 181–185.

# 13. Bryant, R., Kavli, S., Thomas, R., Darji, K., and Mossi, K. (2004) “Experimental characterization of piezoelectric radial field diaphragm for fluidic control.” Actuator, Bremen, Germany, 565–575.

# 14. Mossi, K., Costley, J., Ounaies, Z., and Bryant, R. (2004) “Piezoelectric behavior of pre-stressed curved actuators under load,” Proceeding of the SPIE International Society for Optics Engineering, 5387, 432–441.

# Mossi, K., and Bryant, R. (2003) “Piezoelectric Actuators for Synthetic Jet Applications.” Materials and Devices for Smart Systems Proceedings 785, Material Research Society Fall Meeting, Boston-Massachusetts, USA, D11.8.

# Mossi, K., Scott, L., and Haran, S. (2003) “Characterization of loaded pre-stressed piezoelectric actuators.” Proceeding of the SPIE International Society for Optics Engineering, 5053, 453–459.

# Mossi, K., Ounaies, Z., and Smith, R. (2003) “Pre-stressed curved actuators: characterization and modeling of their piezoelectric behavior.” Proceeding of the SPIE International Society for Optics Engineering, 5053, 423–435.

# Hodges, C., Mossi, K., and Scott, L. (2003) “Adhesive characterization in pre-stressed piezoelectric laminates.” Proceeding of the SPIE International Society for Optics Engineering, 5053, 467–474.

# Mossi, K., and Scott, L. (2002) “Sensor Measurements for Diagnostic Equipment.” First World Congress on Biomimetics and Artificial Muscles, Albuquerque - New Mexico, USA.

# Ounaies, Z., Mossi, K., Smith, R., and Berndt, J. (2001) “Low-field and high field characterization of Thunder actuators,” Proceeding of the SPIE International Society for Optics Engineering, 4333, 399–407.

# Mossi, K., Ounaies, Z., and Oakley, S. (2001) “Optimizing energy harvesting of a composite Unimorph pre-stressed bender.” American Society for Composites Sixteenth Technical Conference, Blacksburg - Virginia, USA.

# Capozzoli, M., Gopalakrishnan, J., Hogan, K., Massad, J., Tokarchik, T., Wilmarth, S., Banks, H., Mossi, K., and Smith, R. (1999) “Modeling aspects concerning THUNDER actuators.” Proceeding of the SPIE International Society for Optics Engineering, 3667, 719–727.

# Mossi, K., Bishop, R., Smith, R., and Banks, H. (1999) “Evaluation criteria for THUNDER actuators.” Proceeding of the SPIE International Society for Optics Engineering, 3667, 738–743.

# Mossi, K., and Bishop, R. (1999) “Characterization of different types of high performance THUNDER actuators,” Proceeding of the SPIE International Society for Optics Engineering, 3675, 43–52.

# Bishop, R., and Mossi, K. (1998) “High displacement, high force piezoelectric actuator and sensor.” The Journal of the Acoustical Society of America, 104(3), 1828.

# Mossi, K., Bryant, R., and Bishop, R. (1998) “THUNDER—a new family of high performance piezoelectric devices to enable advanced automation.” Drive, Sensor and Motion Systems International AMD&C Conference.

# Bishop, R., Mossi, K., Swain, B., and Rose, N. (1997) “Rugged, robust, reliable, new multi-function, high-sensitivity sensor,” Technology 2007 Conference, Boston - Massachusetts, USA.

# Mossi, K. (1997) “Thin-layer-Unimorph ferroelectric driver and sensor characteristics.” Virginia Academy of Science.

# Mossi, K. (1988) “Producción de Briquetas Usando Hollejo de Arroz” BS Thesis, Universidad Nacional Autonoma de Honduras, Centro de Desarrollo Industrial.

# Mossi, K. (1993) “Characterization of Trailing Line Vortices,” MS Thesis, Old Dominion University Research Foundation, Norfolk - Virginia, USA, Prepared for National Aeronautics and Space Administration.

# PROFESSIONAL SOCIETIES SERVICES

* ASME, American Association for Mechanical Engineers, Member and Symposium Organizer
* ACS, American Ceramic Society, Member and Symposium Organizer
* MRS, Materials Research Society, Member
* AAUP, American Association of University Professors, Member
* SPIE, Smart Materials and Structures Society, Member and Reviewer for the student paper competition.
* ASC, American Society for Composites, Member

**INVITED TALKS**

* Mossi, K, (2010) “Recent Advances in Piezoelectric Materials.” JSME/ASME, Kyoto Japan.
* Mossi, K., “Piezoelectric energy harvesting.” Mechanical Engineering Seminar, University of Nevada, Reno, March 2008.USA.

“Harvesting Energy using Piezoelectric Materials,” Stevens Institute of Technology, NJ, 2006.

“Characterization Of Piezoelectric Actuators for Flow Control Over a Wing,” IEEE Student Chapter at Virginia Commonwealth University, 2006.

“Design of Experiments for Piezoelectric Synthetic Jets,” INHA University, Korea 2005.

“Characteristics of Carbon Reinforced Piezoelectric Composites,” Konkuk University, Korea 2005.

“Woman in Engineering and the Workplace,” Virginia Commonwealth University, Fall 2005.

“Piezoelectric Synthetic Jets,” Virginia Commonwealth University, April 2004.

“Synthetic jets using smart materials,” University of Nevada, Las Vegas, March 2004.

“Education and Smart Structures,” International Workshop on Smart Materials and Structures Technology, January 2004.

“Pre-Stressed Actuators,” Delft University, the Netherlands, August 2003.

“`Smart’ Materials as Force Sensors and Their Applications”, Instrumentation Society of America, Richmond, VA 2003.

“Smart Materials and Their Applications,” National Society for Engineers, Honduras, August 2003.

“Piezoelectric Actuators for Sensor Applications,” Old Dominion University, Norfolk, VA, 2002.