Matteo Rinaldi

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http://www.northeastern.edu/nemslab

EDUCATION

Ph.D. in Electrical and Systems Engineering, December, 22 2010.
University of Pennsylvania, Philadelphia, PA, USA.
Dissertation: *Piezoelectric Aluminum Nitride Nano Plate Resonant Sensors for Next Generation Miniaturized Sensing Platforms.*
Advisor: Prof. Gianluca Piazza

Second Level Laurea Degree (M.Sc.) in Electronic Engineering, May, 4 2007.
University of Rome Tor Vergata, Rome, Italy.
Dissertation: *Micromachined Hydrogen sensors based on the variation of Work Function and interface circuits.*
Advisor: Prof. Arnaldo D'Amico
Graduated *cum laude*

First Level Laurea Degree (B.Sc.) in Electronic Engineering, October, 28 2004.
University of Rome Tor Vergata, Rome, Italy.
Dissertation: *Fabrication and characterization of Carbon Nanotube based poly(1,8-dan) and poly(orto-anisidina) nanocomposed films for Organic Electronic Devices.*
Advisor: Prof. Aldo Di Carlo
Graduated *cum laude*

PROFESSIONAL EXPERIENCE

Founder and CEO, *Zepsor Technologies*.
Boston, MA, USA, July 2019 – present.
***Zepsor Technologies**, is a start-up company that aims to bring to market zero standby power sensors for various internet of things applications including distributed wireless fire monitoring systems, battery-less infrared sensor tags for occupancy sensing and distributed wireless monitoring systems of plant health parameters for digital agriculture.*

Director, *Northeastern SMART*.
Northeastern University, Boston, MA, USA, September 2018 – present.
***Northeastern SMART**, is a university research center that, in collaboration with federal agencies and industrial members, aims to conceive and pilot disruptive technological innovation in smart devices and systems required by the fourth industrial revolution in several fields, including the Internet of Things (IoT), 5G, Digital Agriculture, Robotics and Healthcare.*

Associate Professor in the Department of Electrical and Computer Engineering.
Northeastern University, Boston, MA, USA, May 2017 – present.
Research interests: *Explore and understand the fundamental properties of micro/nanomechanical structures and advanced materials (such as piezoelectric materials, 2D materials, metamaterials, phase change materials and magnetic materials) to engineer new classes of micro and nanoelectromechanical systems (M/NEMS) with unique and enabling features applied to the areas of chemical, physical and biological sensing and low power reconfigurable radio communication systems*.

Assistant Professor in the Department of Electrical and Computer Engineering.
Northeastern University, Boston, MA, USA, January 2012 – April 2017.

Postdoctoral Researcher in Prof. Gianluca Piazza's Group (PMaNS Lab).
University of Pennsylvania, Philadelphia, PA, USA, December 2010-December 2011.
Worked on the development of PiezoElectric Non-Linear Nanomechanical Temperature and Acceleration Insensitive Clocks (PENNTAC) – Dynamics Enabled Frequency Sources (DEFYS) DARPA program.

- Demonstrated AlN MEMS based oscillators operating at 1 GHz with extended dynamic range (up to 6 dBm driving power) and unprecedented phase noise performance (-90 dBc/Hz at 1 kHz offset and -170 dBc/Hz phase noise floor).
- Demonstrated 1 GHz oscillators based on temperature compensated AlN MEMS resonators (temperature coefficient of frequency, TCF, ~ 3 ppm/K) with extended dynamic range and low phase noise performance.
- Demonstrated an innovative and high performance micro-ovenized MEMS resonator technology based on an AlN resonant plate and a suspended thin-film micro-heater separated by a sub-micron air gap (3 mW necessary to operate the resonator at ~100 °C)
- Demonstrated the high frequency (970 MHz) and high performance oscillator based on a micro-ovenized MEMS resonator technology (measured phase noise of -85 dBc/Hz at 1 kHz offset and -170 dBc/Hz floor while operating the AlN resonator at ~100 °C).

Graduate Research Fellow in Prof. Gianluca Piazza's Group (PMaNS Lab).
University of Pennsylvania, Philadelphia, PA, USA, July 2007-December 2010.
Developed an innovative gravimetric sensor technology called AlN Nano Plate Resonant Sensor:

- Fabricated Nanoelectromechanical (NEMS) resonant sensors with frequencies of operation ranging between 100 MHz and 10 GHz.
- Demonstrated large scale integration of nano-biocoating layers, such as Single Wall Carbon Nanotubes (SWNTs), ssDNA functionalized SWNTs and thiol-terminated ss-DNA, with the NEMS resonant sensors.
- Demonstrated arrays of NEMS resonant sensors functionalized with ss-DNA and connected to chip-based, low power, self-sustaining multiplexed oscillator (fabricated in the ON Semiconductor 0.5 μm CMOS process) for direct frequency read-out.
- Demonstrated capability to selectively detect concentrations of explosive and toxic agent vapors in the part per trillion (ppt) range.

Graduate Research Fellow in Prof. A. D'Amico's Group (Sensors and Microsystems Lab).
University of Rome Tor Vergata, Rome, Italy, May 2006-June 2007.
Micromachined Hydrogen Sensors:

- Fabricated capacitive hydrogen sensors based on the variation of work function.
- Designed and prototyped low-noise read-out circuit for a micromachined Kelvin Probe based sensor.

Undergraduate Research Assistant in Prof. A. Di Carlo's Group (OptoLab).
University of Rome Tor Vergata, Rome, Italy, March 2004-October 2004.
Fabricates and carachterized carbon nanotube based nanocomposed polymers for organic thin film transistors (OTFT).

HONORS AND AWARDS

EARLY CAREER AWARDS

- ***IEEE Sensors Council Early Career (Young Professionals) Award (2015).***
- ***NSF Faculty Early Career Development (CAREER) Award (2014).***
- ***DARPA Young Faculty Award Class of 2012 (2012).***

BEST PAPER AWARDS

- *IEEE 32nd IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2019) Outstanding Paper Award with his student Ryan Sungho Kang (2019).*
- *IEEE 2017 International Frequency Control Symposium (IFCS 2017) Best Student Paper Award with his student Zhenyun Qian (2017).*
- *18th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2015) Outstanding Paper Award with his student Zhenyun Qian (2015).*
- *IEEE 2015 International Frequency Control Symposium (IFCS 2015) Best Student Paper Award with his student Gwendolyn Hummel (2015).*
- *IEEE International Frequency Control Symposium 2011 Best Student Paper Award (2011).*
- *IEEE International Frequency Control Symposium 2009 Best Student Paper Award (2009).*

BEST PAPER AWARD NOMINATIONS

- *IEEE 2019 International Frequency Control Symposium (IFCS 2019) nominated for Best Student Paper Award with his student Guofeng Chen (2019).*
- *IEEE 2019 International Frequency Control Symposium (IFCS 2019) nominated for Best Student Paper Award with his student Michele Pirro (2019).*
- *IEEE 2019 International Frequency Control Symposium (IFCS 2019) nominated for Best Student Paper Award with his student Flavius Pop (2019).*

- *IEEE 2018 Ultrasonics Symposium (IUS 2018) nominated for Best Student Paper Award with his student Giuseppe Michetti (2018).*
- *IEEE 2018 Ultrasonics Symposium (IUS 2018) nominated for Best Student Paper Award with his student Flavius Pop (2018).*
- *IEEE 2018 International Frequency Control Symposium (IFCS 2018) nominated for Best Student Paper Award with his student Yao Yu (2018).*
- *IEEE 31st IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2018) nominated for Outstanding Paper Award with his student Yao Yu (2018).*
- *IEEE Sensors 2017 nominated for Best Student Paper Award with his student Vageeswar Rajaram (2017).*
- *IEEE 2017 International Frequency Control Symposium (IFCS 2017) nominated for Best Student Paper Award with his student Zhenyun Qian (2017).*
- *IEEE 2016 Sensors Conference (Sensors 2016) nominated for Best Student Paper Award with his student Zhenyun Qian (2016).*
- *IEEE 2015 International Frequency Control Symposium (IFCS 2015) nominated for Best Student Paper Award with his student Zhenyun Qian (2015).*
- *IEEE 2015 International Frequency Control Symposium (IFCS 2015) nominated for Best Student Paper Award with his student Yu Hui (2015).*
- *IEEE 2014 International Frequency Control Symposium (IFCS 2014) nominated for Best Student Paper Award with his student Gwendolyn Hummel (2014).*
- *IEEE 2014 International Frequency Control Symposium (IFCS 2014) nominated for Best Student Paper Award with his student Yu Hui (2014).*
- *IEEE 2013 International Frequency Control Symposium - European Frequency and Time Forum (IFCS-EFTF 2013) nominated for Best Student Paper Award with his student Yu Hui (2013).*
- *IEEE 26th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2013) nominated for Outstanding Poster Paper Award with his student Yu Hui (2013).*
- *IEEE International Ultrasonics Symposium 2010 nominated for Best Student Paper Award (2010).*
- *IEEE International Frequency Control Symposium 2008 nominated for Best Student Paper Award (2008).*

RESEARCH AWARDS

- ***2018 DARPA Riser – PhD. Student Zhenyun Qian (2018).***
- *2017 Chinese Government Award for Outstanding Self-financed Students Abroad – PhD. Student Zhenyun Qian (2018).*
- *The S. J. Stein Prize "Awarded for the superior achievements in the field of new or unique materials or applications for materials in electronics" (2011).*

- *Sebastiano and Rita Raeli Award, after M.Sc. graduation "Awarded for the excellence in the average mark" (2007).*
- *Accenture S.p.A. Best Thesis Dissertation Award, with the (M.Sc.) dissertation: "Micromachined Hydrogen sensors based on the variation of Work Function and interface circuits", (2007).*

ENTREPERNEURIAL AWARDS

- ***TechConnect 2019 Innovation Award as founder and CEO of Zepsor Technologies (2019).***
- *Weiss Tech House Innovation Fund as student inventor of SmartSense technology (2010).*

SCHOLARSHIPS AND FELLOWSHIPS

- *Micron Technology Foundation Inc. Biannual Research Fellowship, for study in the Sensor and Microsystems Group at the University of Rome Tor Vergata (2006-2007).*
- *Didactic assistance "part-time" internship at the Engineering School of the University of Rome Tor Vergata, awarded for the excellence in class grades (2002-2006).*
- *University of Rome Tor Vergata Tuition Free Scholarship, awarded for the excellence in class grades (2002-2006).*

OTHER HONORS

- ***Northeastern University College of Engineering Faculty Fellow (2018).***
- *Elected member of the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society Administrative Committee (AdCom) 1 January 2013 – 31 December 2015 (2012).*

EXTERNAL RESEACRH GRANTS AND FUNDING

Total Funding 2012-2019 ($14,660,684); Rinaldi's Group share 2012-2019 ($9,700,209):

1. **Checkpoint, Inc.:** *Project Rio*, **Lead PI** (60%) with Co-PI Cristian Cassella (Northeastern University, ECE, 40%) **-** (10/1/2019 - 03/31/2021)- **$278,325** (pending agreement execution).

2. **NSF – EECS - CCSS - 1854573:** *Fully Integrated Parametric Filters for Extensive Phase-Noise Reduction in Low-Power RF Front-Ends and Resonant Sensing Platforms*, PM. Dr. Jenshan Lin, **Co-PI** (33%) with PI Cristian Cassella (Northeastern University, ECE, 34%), Co-PI Marvin Onabajo (Northeastern University, ECE, 33%) **-** (8/1/2019 - 07/31/2022) - **$436,944**.

3. **ARPA-E OPEN 2018:** *Zero-Power Wireless Infrared Digitizing Sensors for Large Scale Energy-Smart Farm*, **Sole-PI** - (4/1/2019 - 4/1/2022) - **$1,717,738**.

4. **Checkpoint, Inc.:** *Micromechanical Antennas for RFID Applications*, **Sole-PI** - - (11/1/2018) - **$75,000 (gift agreement)**.

5. **Bill & Melinda Gates Foundation – Investment ID OPP1199522:** *Zero-Power Chemical Sensors for Pests and Disease Monitoring*, **Sole-PI** - (11/1/2018 - 5/1/2020) - **$100,000**.

6. **NSF – US-Korea Collaborative Effort - 1842100:** *Nano Electro Mechanical Resonant Sensing Platform for Chip Scale, High Resolution and Ultra-Fast Terahertz Spectroscopy and Imaging*, PM. Dr. Dimitris Pavlidis, **Sole-PI - $30,000**.

7. **NSF – NeTS Medium CNS - 1763964:** *Collaborative: Reliable Underwater Acoustic Video Transmission Towards Human-Robot Dynamic Interaction*, PM. Dr. Monisha Ghosh, **Co-PI** (25%) with PI Dario Pompili (Rutgers University, ECE, 50%), Co-PI Tommaso Melodia (Northeastern University, ECE, 25%) **-** (9/1/2018 - 08/30/2021) - **$1,000,000**.

8. **Sandia National Laboratory:** *Super High Frequency MEMS Transformers for Near-Zero Power X-Band Wake Up Receiver*, **Sole-PI -** (8/1/2018 - 1/31/2020) - ***$500,026***.

9. **NSF – MRI:** *MRI: SEANet: Development of a Software-Defined Networking Testbed for the Internet of Underwater Things*, PM. Dr. Rita V. Rodriguez, **Co-PI** (25%) with PI Tommaso Melodia (Northeastern University, ECE, 35%), Co-PI Stefano Basagni (Northeastern University, ECE, 20%), Co-PI Milica Stojanovic (Northeastern University, ECE, 20%) **-** (8/1/2017 - 7/31/2020) - ***$1,571,353 ($1,100,000 from NSF)***.

10. **DARPA SPAR - HR0011-17-2-0002*:*** *Microelectromechanical Resonant Circulator (MIRC)*, PM. Dr. Troy Olsson, **Lead PI** (90%) with Co-PI Nicol McGruer (Northeastern University, ECE) **-** (11/01/2016 - 01/31/2020) - **$2,*682,990.*** In this collaborative project, Northeastern University (prime contractor) works with University of Texas at Austin (Co-PI Andrea Alu').

11. **NSF – NeTS Small 1618731:** *Toward Wirelessly Rechargeable And Ultrasonically-networked Implantable Systems*, PM. Dr. Thyagarajan Nandagopal, **Co-PI** (50%) with PI Tommaso Melodia (Northeastern University, ECE) **-** (10/1/2016 - 09/31/2019) - **$300,000**.

12. **DARPA NZero - HR0011-15-2-0048*:*** *Plasmonic Microelectromechanical Infrared Digitizer (PLASMID)*, PM. Dr. Troy Olsson, **Lead PI** (70%) with Co-PI Nicol McGruer (Northeastern University, ECE) **-** (10/01/2015 - 10/15/2018) - **$1,*103,519.***

13. **DARPA NZero - HR0011-15-C-0138*:*** *Zero Power Sensors (ZePS)*, PM. Dr. Troy Olsson, **Lead PI** (50%) with Co-PI Nicol McGruer (Northeastern University, ECE), subcontract with Draper Laboratory **-** (10/01/2015 - 12/31/2018) - **$1,*636,623.*** In this collaborative project, Northeastern University works with Draper Laboratory (prime contractor) and Leidos (total contract award amount **$7,634,164**).

14. **DHS-ALERT-R2-B.3*:*** *Multi-Functional Nano-Electro-Opto-Mechanical Sensing Platform*, **Sole PI** (100%) – (05/01/2015 – 06/30/2020) **- $*400,000.***

15. **W.M. Keck Foundation***: Nanofabricated Neural Probes with Ultra-Sensitive Integrated Compact RF NEMS Magnetoelectric Sensors for Electro-Magneto-Brain Activity Map*, **Co-PI** (30%) with PI Nian Sun (Northeastern University, ECE) and Co-PI Sydney Cash (Massachusetts General Hospital/Harvard Medical School) **-** (7/01/2014 - 6/30/2017) - **$1,*514,588 ($1,000,000 from Keck).***

16. **NSF CAREER Award ECCS-1350114***: CAREER: Nano Electro Mechanical Resonant Sensing Platform for Chip Scale, High Resolution and Ultra-Fast Terahertz Spectroscopy and Imaging*, PM. Dr. George Haddad, **Sole PI** (100%) **-** (4/15/2014 - 3/31/2019) **- $*400,000.***

17. **DARPA-RF-FPGA-N66001-14-1-4011***: Intrinsically Switchable and Programmable MEMS Filter Array*, PM. Dr. Troy Olsson, Dr. William Chappell, **Sole PI** (100%) **-** (2/4/2014 - 2/3/2017) - **$*523,578.***

18. **DARPA-YFA-N66001-12-1-4221**, ***"Young Faculty Award":*** *Un-cooled Nanomechanical Infrared/THz Detectors Based on Piezoelectric Resonant Nano Plates*, PM. Dr. Tayo Akinwande, **Sole PI** (100%) **-** (7/25/2012 - 7/25/2015) - **$*300,000.***

19. **Robert Shillman Foundation:** *Multi-Color Nanomechanical Infrared Detectors for Homeland Security Applications*, **Lead PI** (50%) with Co-PI Eyal Buks (Technion University) **- $90,000**

NORTHEASTERN SMART RESEARCH CENTER MEMBERSHIPS

Total Membership: $1,200,000

1. **Evatec:** *Collaboration Partner Membership*, 2020 - 2025 - **$750,000** (in-kind).

2. **InterDigital:** *Collaboration Partner Membership*, 2020-2022 - **$300,000**.

3. **Checkpoint, Inc.:** *Collaboration Partner Membership*, 2020-2021 - **$150,000** (pending agreement execution).

NORTHEASTERN UNIVERSITY INTERNAL RESEACRH GRANTS AND FUNDING

Total Funding 2012-2019 ($252,500); Rinaldi's Group share 2012-2019 ($238,750):

1. **GapFund360 Phase 2:** *Battery-less Infrared Sensor Tags for Reliable Occupancy Sensing (BISTROS)*, **Lead-PI** with Co-PI Zhenyun Qian - (January, 2020) - **$100,000**.
2. **Tier 2:** *Development of Energy-Smart Farming Large Research Proposals*, **Sole-PI** - (July, 2019) - **$75,000**

3. **GapFund360 Phase 1:** *Battery-less Infrared Sensor Tags for Reliable Occupancy Sensing (BISTROS)*, **Lead-PI** with Co-PI Zhenyun Qian - (January, 2019) - **$50,000**.

4. **Tier 1***: The Multi-Site Ultrasonic Wireless Pacemaker-Defibrillator*, **Co-PI** (50%) with PI Tommaso Melodia – (2015-2016) - ***$27,500.***

STUDENTS AND PERSONNEL TRAINING

RESEARCH FACULTY (1)

- **Dr. Zhenyun Qian, Ph.D. ECE, Northeastern University 2017** (Fall 2018 start)

POSTDOCTORAL RESEARCHERS (3)

- **Dr. Luca Colombo, Ph.D. ECE, Carnegie Mellon University 2019** (Fall 2019 start)
- **Dr. Zhenyun Qian, Ph.D. ECE, Northeastern University 2017** (Summer 2017 – Fall 2018)
  Current position: Research *Assistant Professor, Northeastern University.*
- **Dr. Cristian Cassella, Ph.D. ECE, Carnegie Mellon University 2015** (Summer 2015 – Summer 2018)
  Current position: *Assistant Professor, Northeastern University.*

PhD STUDENTS (16)

- **Hussein Mohamed Elsayed Hussein** (Fall 2019 start – co-advised with Prof. Cassella)
- **Antea Risso** (Fall 2018 start)
- **Giuseppe Michetti** (Fall 2018 start)
- **Flavius Pop** (Fall 2017 start)
- **Michele Pirro** (Summer 2017 start)
- **Sila Deniz Calisgan** (Summer 2017 start)
- **Bernard Herrera Soukup** (Summer 2017 start)
- **Mika (Meruyert) Assylbekova** (Fall 2015 start)
- **Ryan Sungho Kang** (Summer 2015 start)
- **Vageeswar Rajaram** (Fall 2015 start)
- **Yao Yu** (Summer 2016 – Summer 2020)
  Ph.D. in ECE, Northeastern University, expected August 2020
  Thesis: *Micromechanical Resonant RF Circulators.*
  Position (starting August 2020): *Senior Engineer at Texas Instruments.*
- **Guofeng Chen** (Spring 2015 – Fall 2019)
  Ph.D. in ECE, Northeastern University, September 2019
  Thesis: *Piezoelectric Micro-Resonators for Low-Power and Low-Cost IoT Communication Nodes.*
  Current position: *Staff Engineer at Skyworks.*
- **Gwendolyn Hummel** (Summer 2013 - Summer 2018)

NSF Graduate Research Fellowship 2015
Ph.D. in ECE, Northeastern University, August 2018
Thesis: *Integrated Microsystems for Reconfigurable RF Front Ends.*
Current position: *Postdoctoral Researcher, Sandia National Laboratory*

- **Zhenyun Qian** (Summer 2013 - Spring 2017)
  Ph.D. in ECE, Northeastern University, May 2017
  Thesis: *Micro and Nano Electromechanical Systems for Near-Zero Power Infrared Detection.*
  Current position: *Research Assistant Professor, Northeastern University*
- **Yu Hui** (Spring 2012 - Spring 2015)
  Ph.D. in ECE, Northeastern University, May 2015
  Thesis: *Aluminum Nitride Piezoelectric Microelectromechanical Resonant Physical Sensors.*
  Current position: *Staff Engineer at Skyworks*
- **Piotr Kulik** (Fall 2017 – Fall 2018)

MASTER STUDENTS (10)

- **Ryan Sungho Kang** (Summer 2015 - Fall 2018)
  M.S. in ECE, Northeastern University, December 6, 2018
  Thesis: *Ultra-narrowband Metamaterial Absorbers for Multispectral Infrared Microsystems.*
  Current position: *Ph.D. Student at Northeastern University*
- **Giuseppe Michetti** (Summer 2017 – Summer 2018)
  Thesis: Magnetic Free Quasi-LTI Frequency-Selective MEMS RF Circulators.
  Current position: *Ph.D. Student at Northeastern University*
- **Bernard Herrera Soukup** (Fall 2016 start – Summer 2017)
  Thesis: *Piezoelectric Micromachined Ultrasonic Transducers for Intra-Body Networks.*
  Current position: *Ph.D. Student at Northeastern University*
- **Gwendolyn Hummel** (Summer 2013 - Summer 2015)
  M.S. in ECE, Northeastern University, August 2015
  Thesis: *Monolithic Integration of Phase Change Materials and Aluminum Nitride Contour-Mode MEMS Resonators for Highly Reconfigurable Radio Frequency Systems.*
  Current position: *Ph.D. Student at Northeastern University*
- **Eric Walther-Grant** (Fall 2014 - Summer 2015)
  M.S. in ECE, Northeastern University, August 2015
  Thesis: *Analysis of Combined-Mode Resonance in AlN Resonators.*
  Current position:
- **Vageeswar Rajaram** (Spring 2014 - Spring 2015)
  M.S. in ECE, Northeastern University, May 2015
  Thesis: *Uncooled MEMS IR Sensors for Miniaturized and Low Power Spectroscopy.*
  Current position: *Ph.D. Student at Northeastern University*
- **Yukang Feng** (Summer 2013 - Summer 2014)
  M.S. in ECE, Northeastern University, August 2014
  Thesis: *Tunable Metamaterial Absorber Design with Aluminum Nitride Micro Actuator and Split Ring Resonators.*

Current position: *Ph.D. Student at University of Virginia*

- **Raul Vyas** (Spring 2013 - Summer 2014)
  M.S. in ECE, Northeastern University, August 2014
  Thesis: *Aluminum Nitride MEMS Resonant Thermal Biosensors.*
  Current position: *Ph.D. Student at Duke University*
- **Zhenyun Qian** (Summer 2012 - Summer 2013)
  M.S. in ECE, Northeastern University, August 2013
  Thesis: *Graphene-Aluminum Nitride Nano Plate Resonators.*
  Current position: *Ph.D. Student at Northeastern University*
- **Giovanni Lanzilli** (co-examiner)
  M.Sc. (laurea degree) in EE, University of Rome Tor Vergata, October 2011
  Thesis: *The AlN Nano Plate NEMS Resonant Sensor Technology: Experimental Characterization and Functionalization Using Metalloporphyrins.*
  Current position: *External Sales Account at Keyence*

PROGRAM MANAGER (1)

- **Dr. Wenjun Zhang, PMP®, Ph.D. Interdisciplinary Engineering, Northeastern University 2016** (March 2019 start)

OTHER GRADUATE STUDENT DEFENSE COMMITTEES:

- **Ufuk Muncuk**, Ph.D., Northeastern University, ECE (PhD Proposal January 2019)
- **Hessam Izadkhah**, Ph.D., Northeastern University, ECE (PhD Proposal September 2018, Defense March 2019)
- **William Zhu**, Ph.D., Northeastern University, MIE (PhD Proposal January 2018)
- **Cinzia Silvestri**, Ph.D., TU Delft, EE (PhD Defense July 2017)
- **Chenye Yang**, Ph.D., Northeastern University, MIE (PhD Defense April 2017)
- **Tian Liu**, Ph.D., Northeastern University, MIE (PhD Defense April 2017)
- **Xin Xie**, Ph.D., Northeastern University, ECE (PhD Defense April 2017)
- **Giacomo Laghi**, Ph.D., Politecnico of Milan, EE (co-examiner, Defense February 2017)
- **Stefano Dellea**, Ph.D., Politecnico of Milan, EE (Defense February 2017)
- **Giacomo Gervasoni**, Ph.D., Politecnico of Milan, EE (Defense February 2017)
- **Enrico Santagati**, Ph.D., Northeastern University, ECE (PhD Defense January 2017)
- **Kan Yao**, Ph.D., Northeastern University, MIE (PhD Defense July 2017)
- **Yunqing Du**, Ph.D., Northeastern University, Interdis. Bioeng. (PhD Defense June 2016)
- **Hari Chauhan**, Ph.D., Northeastern University, ECE (PhD Defense April 2016)
- **Erfan Kheirkhahi**, Ph.D., Northeastern University, ECE (August 2015)
- **Yuan Gao**, Ph.D., Northeastern University, ECE (August 2015)
- **Pilin Junsangsri**, Ph.D., Northeastern University, ECE (October 2015)
- **Ryan T Myers**, Ph.D., Northeastern University, BioEng (June 2014)
- **Tianxian Nan**, MS., Ph.D., Northeastern University, ECE (MS. April 2014, Ph.D. August 2015)

- **Anirban Basu**, Ph.D., Northeastern University, ECE (December 2013)
- **Anup Singh**, Ph.D., Northeastern University, ECE (December 2013)
- **Yuchi Ni**, MS., Northeastern University, ECE (November 2013)
- **Ryan Hennessy**, Ph.D., Northeastern University, ECE (August 2013)
- **Nimet Yildirim**,Ph.D., Northeastern University, BioEng (April 2013)
- **Wenjun Zhang,** Ph.D., Northeastern University, CEE (February 2013)
- **Khabat Ebnabbasi**, Ph.D., Northeastern University, ECE (November 2012)
- **Thaddaeus Webster**, Ph.D., Northeastern University, ChE (December 2014)
- **Ufuk Muncuk,** MS., Northeastern University, ECE (June 2012)

TEACHING EXPERIENCE

Northeastern University, Boston, MA, USA.
- *Microelectromechanical Systems, EECE 7244, Fall 2012-2020.*
- *Micro and Nano Fabrication, EECE 5606, Spring 2012-2020.*

University of Pennsylvania, Philadelphia, PA, USA.
- *Special Guest Lecturer, ESE 529 – RF MEMS (graduate), Fall 2010.*
- *Teaching Assistant, ESE 218 – Physics and Models of Semiconductor Devices (undergraduate), Spring 2009.*
- *Teaching Assistant, ESE 529 – RF MEMS (graduate), Fall 2008.*
- *Supervisor of several undergraduate and graduate research projects, 2007-2011.*

INVITED TALKS, SEMINARS AND TUTORIALS

T1. *Near-Zero Power Integrated Microsystems for the IoT*, **15th International Conference on Modern Materials and Technologies (CIMTEC 2020),** Montecatini Terme, Italy, June 15-23, 2020 **[Invited Talk]**.

T2. *Near-Zero Power Integrated Microsystems for the IoT*, **Micro- and Nanotechnology Sensors, Systems, and Applications Conference at SPIE Defense+Commercial Sensing 2020,** Anaheim, California, United States, April 26-30, 2020 **[Invited Talk]**.

T3. *Magnetic-Free Radio Frequency Circulators Based on Spatiotemporal Modulation of Microacoustic Resonators and Filters*, **14th European Conference on Antennas and Propagation (EuCAP 2020),** Copenhagen, Denmark, March 15-20, 2020 **[Invited Talk]**.

T4. *Near-Zero Power Integrated Microsystems for the IoT*, **University of Massachusetts, Boston**, **physics department distinguished seminar series**, December 12, 2019 **[Invited Seminar]**.

T5. *Near-Zero Power Integrated Microsystems for the IoT*, **Microelectronics 2.0 Workshop**, **A*Star, Institute of Microelectronics**, Singapore, November 18, 2019 **[Invited Talk]**.

T6. *Near-Zero Power Integrated Microsystems for the IoT*, **66th Annual AVS International Symposium and Exhibition (AVS 66),** Columbus, OH, October 20-25, 2019 **[Invited Talk]**.

T7. *Near-Zero Power Integrated Microsystems for the IoT*, **Gordon Research Conference on Plasmonically-Powered Processes,** The Hong Kong University of Science and Technology in Hong Kong, July 30, 2019 **[Invited Talk]**.

T8. *Piezoelectric Resonant MEMS Devices for Radio Frequency Communication and Sensing Applications*, **International Workshop on PiezoMEMS,** Lausanne, Switzerland, July 14, 2019 **[Invited Tutorial]**.

T9. *Near-Zero Power Integrated Microsystems for the IoT*, **Military IoT and Sensors Summit,** Alexandria, VA, April 4, 2019 **[Invited Talk]**.

T10. *Near-Zero Power Integrated Microsystems for the IoT*, **Passive Wireless Sensor Technology Workshop, WiSEE 2018,** Huntsville, Alabama, December 11, 2018 **[Invited Talk]**.

T11. *Near-Zero Power Integrated Microsystems for the IoT*, **Emerging Sensor Technologies and Data Analytics for Air Quality Monitoring, DST-UKIERI Workshop IEEE Sensors 2018**, IIT Delhi, New Delhi, India, November 1, 2018 **[Invited Talk]**.

T12. *Magnetic-Free Radio Frequency Circulator Based on Spatiotemporal Modulation of MEMS Resonators*, **IEEE International Ultrasonic Symposium 2018**, Kobe, Japan, October 24, 2018 **[Invited Talk]**.

T13. *Near-Zero Power Integrated Microsystems for the IoT*, **Sloan Foundation Workshop on NanoChemistry of Indoor Environments**, ASRC CUNY, New York, July 12, 2018 **[Invited Talk]**.

T14. *Single-Chip Multi-Frequency Radio Frequency Passive Components Based on Aluminum Nitride Cross-Sectional Lamé Mode MEMS Resonators*, **2018 International Microwave Symposium (IMS)**, Philadelphia, USA, June 10-15 2018 **[Invited Talk]**.

T15. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **A*Star, Institute of Microelectronics**, Singapore, April 27, 2018 **[Invited Seminar]**.

T16. *Near-Zero Power Integrated Microsystems for the IoT*, **IEEE NEMS 2018**, Singapore, April 24, 2018 **[Invited Talk]**.

T17. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **National Tsing Hua University, NEMS Institute**, Hsinchu, Taiwan, April 20, 2018 **[Invited Seminar]**.

T18. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **National Taiwan University, Institute of Applied Mechanics**, Taipei, Taiwan, April 20, 2018 **[Invited Seminar]**.

T19. *Paradigm Shift in MEMS/NEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **Advanced Science Research Center (ASRC), CUNY**, New York City, USA, April 5, 2018 **[Invited Seminar]**.

T20. *Single-Chip Multi-Frequency Radio Frequency Passive Components Based on Aluminum Nitride Cross-Sectional Lamé Mode MEMS Resonators*, **6th International Workshop on Piezoelectric MEMS**, Orlando, FL, USA, 15-16 January 2018 **[Invited Talk]**.

T21. *Magnetic-Free Radio Frequency Circulator Based on Spatiotemporal Commutation of MEMS Resonators*, **URSI National Radio Science Meeting (NRSM)**, Boulder, CO, USA, 4-7 January 2018 **[Invited Talk]**.

T22. *Plasmonically-enhanced Microelectromechanical Systems*, **EUPROMETA - 35th Doctoral School on Metamaterials**, Rome, Italy, December 22, 2017 **[Invited Lecture]**.

T23. *MEMS Sensors for the Internet of Things in Smart Cities,* **Saigon Hi-Tech Park (SHTP) MEMS/Sensors Forum***,* Ho Chi Minh City, Vietnam, November 9, 2017 **[Plenary Talk]**.

T24. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **Cornell University, ECE Department**, Ithaca, NY, USA, November 17, 2017 **[Invited Seminar]**.

T25. *Multi-Spectral Infrared Sensing Microsystems*, **Advanced Development for Security Applications Workshop (ADSA 2017)**, Boston, MA, USA, October 18, 2017 **[Invited Talk]**.

T26. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **Texas Instruments**, Santa Clara, CA, USA, August 24, 2017 **[Invited Seminar]**.

T27. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **TRF Napa Microsystems Workshop**, Napa, CA, USA, August 21-23, 2017 **[Invited Talk]**.

T28. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **Arizona State University, ECE Department**, Tempe, AZ USA, June 28, 2017 **[Invited Seminar]**.

T29. *Zero Power Infrared Digitizers based on Plasmonically-enhanced Micromechanical Photoswitches*, **DARPA MTO Workshop on Application of N-ZERO Nanowatt**

Wakeup Sensors in Wireless Sensor Networks, Fairfax, VA, USA, June 15, 2017 **[Invited Talk]**.

T30. *Radio Frequency Passive Components Based on Aluminum Nitride Cross-Sectional Lamé Mode MEMS Resonators*, **2017 International Microwave Symposium (IMS)**, Honolulu, USA, June 9th, 2017 **[Invited Talk]**.

T31. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **Columbia University, EE Department**, New York, NU USA, February 28, 2017 **[Invited Seminar]**.

T32. *Paradigm Shift in MEMS toward Multi-Functional and Near-Zero Power Integrated Microsystems*, **University of Pennsylvania, ESE Department**, Philadelphia, PA USA, October 4th, 2016 **[Invited Seminar]**.

T33. *MEMS Sensors and Wireless Communication Devices for IoT*, **IEEE 25th International Conference on Computer Communication and Networks (ICCCN 2016)**, Waikoloa, Hawaii, USA, August 1st, 2016 **[Invited Panel Talk]**.

T34. *Aluminum Nitride Piezoelectric MEMS for Advanced Sensing and Wireless Communications*, **Analog Devices**, Norwood, MA, July 15th, 2016 **[Invited Talk]**.

T35. *Cross-Sectional Lamé Mode Contiguous Filters For Next-Generation LTE-Advanced Platforms*, **2016 International Microwave Symposium (IMS)**, San Francisco, USA, May 23rd, 2016 **[Invited Talk]**.

T36. *Hybrid MEMS/NEMS for Advanced Sensing and Wireless Communications*, **2016 CMOS Emerging Technologies Research Symposium**, Montreal, QC, Canada, May 26th, 2016 **[Invited Talk]**.

T37. *Plasmonic Piezoelectric NEMS Resonant Infrared Detectors*, **IEEE Sensors 2015**, Busan, Korea, November 2nd, 2015 **[Invited Talk]**.

T38. *Intrinsically Switchable and Programmable MEMS Filter Array*, **DARPA Review Meeting on Radio Frequency-Field Programmable Gate Arrays (RF-FPGA) hosted by Dr. Roy (Troy) Olsson**, Denver, USA, September 15th, 2015 **[Invited Talk]**.

T39. *Multi-functional and Reconfigurable Piezoelectric MEMS/NEMS Resonators for Advanced Sensing and Wireless Communications*, **IEEE International Frequency Control Symposium 2015**, Denver, USA, April 12th, 2015 **[Invited Talk]**.

T40. *Piezoelectric NEMS Resonant Nano Plates for Multi-functional and Reconfigurable Wireless Sensing Platforms*, **2015 CMOS Emerging Technologies Research Symposium**, Vancouver, BC, Canada, May 21st, 2015 **[Invited Talk]**.

T41. *Piezoelectric Resonant MEMS Devices for Radio Frequency Communication and Sensing Applications*, **IEEE International Frequency Control Symposium 2015**, Denver, USA, April 12th, 2015 **[Invited Tutorial]**.

T42. *Piezoelectric Resonant MEMS/NEMS Devices for Sensing Applications*, **IEEE Sensors 2014**, Valencia, Spain, November 2nd, 2014 **[Invited Tutorial]**.

T43. *Intrinsically Switchable and Programmable MEMS Filter Array*, **DARPA Review Meeting on Radio Frequency-Field Programmable Gate Arrays (RF-FPGA) hosted by Dr. Roy (Troy) Olsson**, Dallas, TX, October 14th, 2014 **[Invited Talk]**.

T44. *Piezoelectric NEMS Resonant Nano Plates for Multi-functional and Reconfigurable Wireless Sensing Platforms*, **University of Illinois at Urbana-Champaign**, September 2nd, 2014 **[Invited Seminar]**.

T45. *Piezoelectric NEMS Resonant Nano Plates for Multi-functional and Reconfigurable Wireless Sensing Platforms*, **6th International Symposium on Functional Materials (ISFM 2014)**, Singapore, August 4th-7th, 2014 **[Invited Talk]**.

T46. *Piezoelectric Resonant MEMS Devices for Radio Frequency Communication and Sensing Applications*, **IEEE International Frequency Control Symposium 2014**, Taipei, Taiwan, May 19th, 2014 **[Invited Tutorial]**.

T47. *Advanced NEMS Solutions for Chemical, Physical and Biological Detection*, **2014 Nano and Giga Challenges in Electronics, Photonics and Renewable Energy Symposium**, Phoenix, Arizona, USA, March 2014 **[Invited Talk]**.

T48. *Piezoelectric NEMS Resonant Nano Plates for Multi-functional and Reconfigurable Wireless Sensing Platforms*, **Faculty's Colloquium Series at the Christian-Albrechts-Universität zu Kiel, Kiel, Germany**, December 9th, 2013 **[Invited Seminar]**.

T49. *Advanced NEMS Solutions for Chemical, Physical and Biological Detection*, **2013 CMOS Emerging Technologies Research Symposium**, Whistler, BC Canada, July 19th, 2013 **[Invited Talk]**.

T50. *The Aluminum Nitride Nano Plate Resonant Sensor Technology for Chemical, Physical and Biological Detection.* **University of Rome Tor Vergata EE Department,** Rome, Italy, December 19th 2011 **[Invited Seminar].**

T51. *Piezoelectric Aluminum Nitride Nano Plate Resonant Devices for Next Generation Miniaturized Sensing Platforms,* **Northeastern University ECE Department,** Boston, MA, USA, April 12th 2011 **[Invited Seminar].**

PUBLICATIONS

Citations (according to Google Scholar Citation Index) are current as of December 27, 2019. The total number of citations since 2009 is 1926, the h-index is 23, and the i-10 index is 49. Students and postdocs co-authors in my group are underlined.

BOOK CHAPTERS

B1. **M. Rinaldi**, ***"Laterally vibrating resonators"****, in "Piezoelectric MEMS Resonators" volume of "Microsystems and Nanosystems" series*, R. T. Howe and A. J. Ricco, Ed., ed: Springer, 10.1007/978-3-319-28688-4, 2017.

B2. Y. Hui and **M. Rinaldi**, ***"MEMS Resonant Infrared Sensors"****, in Encyclopedia of Nanotechnology*, Springer, 2016, B. Bhushan, Ed., ed: Springer, 2016, pp. 1-9, *ISBN:978-94-007-6178-0*, *doi:10.1007/978-94-007-6178-0_100962-1*, http://dx.doi.org/10.1007/978-94-007-6178-0_100962-1, 2016.

B3. **M. Rinaldi**, ***"NEMS Resonant Chemical Sensors"****, in Encyclopedia of Nanotechnology*, Springer, 2012, B. Bhushan, Ed., ed: Springer, pp. 1888-1895, 2012.

JOURNAL PAPERS

Submitted and under review:

J1. G. Chen and **M. Rinaldi**, ***"*AlN Combined Overtone Resonators for the 5G mmWave Spectrum*"***, *IEEE IEEE/ASME Journal of Microelectromechanical Systems (JMEMS)*, under review since October 2019.

J2. F. Pop, B. Herrera, C. Cassella, and **M. Rinaldi**, ***" Enabling Real-Time Monitoring of Intrabody Networks through the Acoustic Discovery Architecture"***, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, under review since June 2019.

Published or accepted:

J1. Z. Qian, V. Rajaram, S. Kang and **M. Rinaldi**, ***"*High Figure-of-Merit NEMS Thermal Detectors based on 50-nm Thick AlN Nano-Plate Resonators*"***, *Applied Physics Letters* 115, 261102, https://doi.org/10.1063/1.5128643 (2019).

J2. Y. Yu, G. Michetti, M. Pirro, A. Kord, D. Sounas, Z. Xiao, C. Cassella, A. Alu' and **M. Rinaldi**, ***"*Highly-Linear Magnet-Free Microelectromechanical Circulators*"***, *IEEE IEEE/ASME Journal of Microelectromechanical Systems (JMEMS)*, vol. 28, no. 6, pp. 933-940, doi: 10.1109/JMEMS.2019.2947903 (2019).

J3. Y. Yu, G. Michetti, M. Pirro, A. Kord, D. Sounas, Z. Xiao, C. Cassella, A. Alu' and **M. Rinaldi**, ***"*Radio Frequency Magnet-free Circulators Based on Spatiotemporal

Modulation of Surface Acoustic Wave Filters*"*, *IEEE Transactions on Microwave Theory and Techniques*, doi: 10.1109/TMTT.2019.2943291 (2019).

J4. C. Cassella, G. Michetti, M. Pirro, Y. Yu, A. Kord, D. Sounas, A. Alu' and **M. Rinaldi**, ***"*Radio Frequency Angular Momentum Biased Quasi-LTI Nonreciprocal Acoustic Filters***"***, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, doi: 10.1109/TUFFC.2019.2931121 (2019).

J5. S. Kang, Z. Qian, V. Rajaram, S. D. Calisgan, A. Alu' and **M. Rinaldi**, ***"*Ultra-Narrowband Metamaterial Absorbers for High Spectral Resolution Infrared Spectroscopy***"***, *Advanced Optical Materials 2018, 1801236*, doi: 10.1002/adom.201801236 (2018)

J6. W. Z. Zhu, T. Wu, G. Chen, C. Cassella, M. Assylbekova, **M. Rinaldi** and N. McGruer, ***"Design and Fabrication of an Electrostatic AlN RF MEMS Switch for Near-Zero Power RF Wake-Up Receivers"***, *IEEE Sensors Journal*, vol. 18, no. 24, pp. 9902-9909, 15 Dec.15, doi: 10.1109/JSEN.2018.2860593, (2018).

J7. V. Rajaram, Z. Qian, S. Kang, S.D. Calisgan, N. McGruer and **M. Rinaldi**, ***"Zero-Power Electrically Tunable Micromechanical Photoswitches"***, *IEEE Sensors Journal*, vol. 18, no. 19, pp. 7833-7841, 1 Oct.1, 2018, doi: 10.1109/JSEN.2018.2850898, (2018).

J8. Jonathan M Puder, Jeffrey S Pulskamp, Ryan Q Rudy, Cristian Cassella, Guofeng Chen, **Matteo Rinaldi**, Sunil A Bhave, Ronald G Polcawich, ***"Rapid Harmonic Analysis of Piezoelectric MEMS Resonators"***, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control. doi: 10.1109/TUFFC.2018.2822119*, (2018).

J9. Z. Qian, S. Kang, V. Rajaram, C. Cassella, N. McGruer and **M. Rinaldi**, ***"Zero Power Infrared Digitizers Based on Plasmonically-enhanced Micromechanical Photoswitches"***, *Nature Nanotechnology*, 12, 969-973, doi:10.1038/nnano.2017.147 (2017) [*This work was featured as the* ***cover image*** *of the October 2017 issue of* ***Nature Nanotechnology****. The article was highlighted in the press, including: DARPA, TechCrunch, Digital Trends, IEEE Spectrum, LaserFocusWorld, Futurism, Manila Bulletin, News@Northeastern*].

J10. T. Nan, H. Lin, Y. Gao, A. Matyushov, G. Yu, H. Chen, N. Sun, S. Wei, Z. Wang, M. Li, X. Wang, A. Belkessam, R. Guo, B. Chen, J. Zhou, Z. Qian, Y. Hui, **M. Rinaldi**, M. McConney, B. Howe, Z. Hu, J. Jones, G. Brown and N. Sun, ***"Acoustically Actuated Ultra-Compact NEMS Magnetoelectric Antennas"***, *Nature Communications*, 8, Article number: 296, doi:10.1038/s41467-017-00343-8 (2017).

J11. M. Li, A. Matyushov, C. Dong, H. Chen, H. Lin, T. Nan, Z. Qian, **M. Rinaldi**, Y. Lin, and N. X. Sun, "***Ultra-sensitive NEMS magnetoelectric sensor for picotesla DC magnetic field detection***," *Applied Physics Letters*, vol. 110, p. 143510, (2017).

J12. G. Chen, C. Cassella, Z. Qian, G. Hummel and **M. Rinaldi**, ***"Lithographically Defined Aluminum Nitride Cross-Sectional Lamé Mode Resonators"***, *Journal of Micromechanics and Microengineering*, vol. 27, p. 034003, doi:10.1088/1361-6439/aa5a83 (2017).

J13. C. Cassella, G. Chen, Z. Qian, G. Hummel and **M. Rinaldi**, ***"Radio Frequency Passive Components Based on Aluminum Nitride Cross-Sectional Lamé Mode MEMS Resonators"***, *IEEE Transactions on Electron Devices*, vol. 64, no. 1, pp. 237-243, Jan. 2017 doi: 10.1109/TED.2016.2621660 (2017).

J14. Z. Qian, Y. Hui, F. Liu, S. Kar and **M. Rinaldi**, ***"Graphene-Aluminum NEMS Resonant Infrared Detector"***, *Microsystems & Nanoengineering,* vol. 2, p. 16026, DOI: 10.1038/micronano.2016.26 (2016).

J15. C. Cassella, G. Chen, Z. Qian, G. Hummel and **M. Rinaldi**, ***"Cross-Sectional Lamé Mode Ladder Filters for UHF Wideband Applications"***, *IEEE Electron Device Letters*, *vol. 37, pp. 681-683, doi: 10.1109/LED.2016.2539243* (2016).

J16. Y. Hui, J. S. Gomez-Diaz, Z. Qian, A. Alu' and **M. Rinaldi**, ***"Plasmonic Piezoelectric Nanomechanical Resonator for Spectrally Selective Infrared Sensing"***, *Nature Communications*, *7:11249 doi: 10.1038/ncomms11249* (2016).

J17. C. Cassella, Y. Hui, Z. Qian, G. Hummel and **M. Rinaldi**, ***"Aluminum Nitride Cross-Sectional Lamé Mode Resonators"***, *IEEE/ASME Journal of Microelectromechanical Systems (JMEMS), vol. 25, no. 2, pp. 275-285, doi: 10.1109/JMEMS.2015.2512379* (2016) [***This manuscript was identified to be of excellent quality and was highlighted as one of the 3 JMEMS RightNow Papers of the issue***].

J18. G. Hummel, Y. Hui and **M. Rinaldi**, ***"Reconfigurable Piezoelectric MEMS Resonator using Phase Change Material Programmable Vias"***, *IEEE/ASME Journal of Microelectromechanical Systems (JMEMS), vol. 24, n. 6, pp. 2145-2151* (2015).

J19. Z. Qian, F. Liu, Y. Hui, S. Kar and **M. Rinaldi**, ***"Graphene as a Massless Electrode for Ultra-high-frequency Piezoelectric Nano Electro Mechanical Systems"***, *Nano Letters*, 15 (7), pp. 4599–4604, doi:10.1021/acs.nanolett.5b01208 (2015).

J20. Y. Hui, T. Nan, N. Sun, **M. Rinaldi**, ***"High Resolution Magnetometer based on a High Frequency Magnetoelectric MEMS-CMOS Oscillator"***, *IEEE/ASME Journal of Microelectromechanical Systems (JMEMS)*, vol. 24, no. 1, pp. 134-143, doi: 10.1109/JMEMS.2014.2322012 (2015) [***This manuscript was identified to be of excellent quality and was highlighted as one of the 3 JMEMS RightNow Papers of the issue***].

J21. T. Nan, Y. Hui, **M. Rinaldi**, N. Sun ***"Self-Biased 215MHz Magnetoelectric NEMS Resonator for Ultra-Sensitive DC Magnetic Field Detection"****, Scientific Reports, 3, Article number: 1985*. (2013).

J22. Y. Hui and **M. Rinaldi**, ***"Fast and High Resolution Thermal Detector Based on an Aluminum Nitride Piezoelectric Microelectromechanical Resonator with an Integrated Suspended Heat Absorbing Element"***, *Applied Physics Letters*, 102, 093501 (2013).

J23. A. Tazzoli**, M. Rinaldi**, G. Piazza, ***"Experimental Investigation of Thermally Induced Non-Linearities in Aluminum Nitride Contour Mode MEMS Resonators"***, IEEE Electron Device Letters,* vol. 33, issue 5, pp. 724-726, (2012).

J24. **M. Rinaldi**, C. Zuo, J. Van der Spiegel and G. Piazza, ***"Reconfigurable CMOS Oscillator based on Multi-Frequency AlN Contour-Mode MEMS Resonators"***, IEEE Transactions on Electron Devices,* vol. 58, issue 5, pp. 1281-1286, (2011).

J25. **M. Rinaldi**, C. Zuniga, C. Zuo, and G. Piazza, ***"Super High Frequency Two-Port AlN Contour-Mode Resonators for RF Applications"***, IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control,* vol. 57, n. 1, pp. 38-45, 2010. [*A combination of Figure 4 and Figure 9 of this manuscript appears as* ***cover image*** *of the January 2010 issue of IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control*].

J26. C. Zuniga, **M. Rinaldi**, S. M. Khamis, A. T. Johnson, and G. Piazza, ***"Nanoenabled Microelectromechanical Sensor for Volatile Organic Chemical Detection"***, *Applied Physics Letters*, vol. 94, 223122, 2009. [*This manuscript was selected for the* ***Virtual Journal of Nanoscale Science & Technology*** *-- June 22, 2009, Volume 19, Issue 25 and for the* ***Virtual Journal of Biological Physics Research*** *-- June 15, 2009, Volume 17 Issue 12*].

CONFERENCE PAPERS

[IEEE MEMS (acceptance ~30%, <10% oral), Hilton Head (acceptance ~40%, <10% oral), Transducers (acceptance ~40%, ~20% oral), IEEE Sensors (acceptance ~50%, ~20% oral), IEEE Frequency Control Symposium (acceptance ~70%, ~30% oral), IEEE Ultrasonic Symposium (acceptance ~60%, ~30% oral)]

C1. F. Pop, B. Herrera and **M. Rinaldi**, "***Implantable Bio-Heating System based on Piezoelectric Micromachined Ultrasonic Transducers***", *Proceedings of the 33rd International Conference on Micro Electro Mechanical Systems (MEMS 2020)*, Vancouver, Canada, January 18-22, 2020, in press.

C2. G. Michetti, M. Pirro, Y. Yu, G. Chen, C. Cassella and **M. Rinaldi**, "***Reconfigurable N path MEMS Filter based on the Periodic Commutation of Single Frequency Resonators***", *Proceedings of the 33rd International Conference on Micro Electro Mechanical Systems (MEMS 2020)*, Vancouver, Canada, January 18-22, 2020, in press.

C3. Y. Yu and **M. Rinaldi**, "***Micro-Acoustic Quad Circulator with Self-Interference Cancellation***", *Proceedings of the 33rd International Conference on Micro Electro Mechanical Systems (MEMS 2020)*, Vancouver, Canada, January 18-22, 2020, in press.

C4. S. D. Calisgan, V. Rajaram, Z. Qian, S. Kang, A. Risso, and **M. Rinaldi**, ***"Zero-Power Chemical Sensor Based on a Polymer/Metal Micromechanical Switch"*** *Proceedings of the IEEE Sensors (SENSORS 2019)*, Montreal, Canada, October 27-30, 2019, in press.

C5. B. Herrera, F. Pop, C. Cassella and **M. Rinaldi**, ***"pMUT-Enabled Underwater Acoustic Source Localization System"*** *Proceedings of the 2019 IEEE International Ultrasonics Symposium,* Glasgow, Scotland, UK., October 6-9 2019, in press.

C6. F. Pop, B. Herrera, C. Cassella and **M. Rinaldi**, ***"Novel Phased-Array Platform based on Directly Modulated Ultrasonic Transducers (dMUT)"*** *Proceedings of the 2019 IEEE International Ultrasonics Symposium,* Glasgow, Scotland, UK., October 6-9 2019, in press.

C7. S. Calisgan, S. Kang, V. Rajaram, Z. Qian and **M. Rinaldi**, ***"THRESHOLD-TRIGGERED MEMS-CMOS INFRARED RESONANT DETECTOR WITH NEAR-ZERO STANDBY POWER CONSUMPTION"*** *Proceedings of the 20th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2019)*, Berlin, Germany, June 23-27, 2019, pp. 637-640, doi: 10.1109/TRANSDUCERS.2019.8808404.

C8. F. Pop, B. Herrera, C. Cassella, W. Zhu, M. Assylbekova, N. McGruer and **M. Rinaldi**, ***"ZERO-POWER ACOUSTIC WAKE-UP RECEIVER BASED ON DMUT TRANSMITTER, PMUTS ARRAYS RECEIVERS AND MEMS SWITCHES FOR INTRABODY LINKS"*** *Proceedings of the 20th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2019)*, Berlin, Germany, June 23-27, 2019, pp. 150-153, doi: 10.1109/TRANSDUCERS.2019.8808176.

C9. B. Herrera, F. Pop, C. Cassella, and **M. Rinaldi**, ***"ALN PMUT-BASED ULTRASONIC POWER TRANSFER LINKS FOR IMPLANTABLE ELECTRONICS"*** *Proceedings of the 20th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2019)*, Berlin, Germany, June 23-27, 2019, pp. 861-864, doi: 10.1109/TRANSDUCERS.2019.8808320.

C10. G. Chen and **M. Rinaldi**, ***"SUPER HIGH FREQUENCY LATERAL-FIELD-EXCITED ALUMINUM NITRIDE CROSS-SECTIONAL LAME' MODE RESONATORS"*** *Proceedings of the 20th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2019)*, Berlin, Germany, June 23-27, 2019, pp. 539-542, doi: 10.1109/TRANSDUCERS.2019.8808381.

C11. Y. Yu and **M. Rinaldi**, ***"CHIP SCALE MICRO-ACOUSTIC RADIO FREQUENCY GYRATOR"*** *Proceedings of the 20th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2019)*, Berlin, Germany, June 23-27, 2019, pp. 901-904, doi: 10.1109/TRANSDUCERS.2019.8808742.

C12. C. Cassella, M. Pirro, G. Michetti and **M. Rinaldi**, ***"Ultra-high Isolation Nonreciprocal Acoustic Filters"***, *Proceeding of the IEEE International Microwave Symposium (IMS 2019)*, Boston, Massachusetts, June 2-7 2019, pp. 524-527. doi: 10.1109/MWSYM.2019.8701046.

C13. G. Chen and **M. Rinaldi**, ***"High-Q X-Band Aluminum Nitride Combined Overtone Resonators"*** *Proceedings of the 2019 IEEE International Frequency Control Symposium (IFCS 2019)*, Orlando, FL, April 14-18, 2019, in press **[Nominated for Best Student Paper Award]**.

C14. F. Pop, B. Herrera, C. Cassella and **M. Rinaldi**, ***"pMUT-based Real-Time (RT) Acoustic Discovery Architecture (ADA) for Intrabody Networks (IN)"*** *Proceedings of the 2019*

IEEE International Frequency Control Symposium (IFCS 2019), Orlando, FL, April 14-18, 2019, in press **[Nominated for Best Student Paper Award]**.

C15. M. Pirro, C. Cassella, G. Michetti and **M. Rinaldi** ***"Low loss non reciprocal filter for miniaturized RF-front-end platforms"*** *Proceedings of the 2019 IEEE International Frequency Control Symposium (IFCS 2019)*, Orlando, FL, April 14-18, 2019, in press **[Nominated for Best Student Paper Award]**.

C16. Y. Yao and **M. Rinaldi**, ***"Wi-Fi-band Micro Acoustic Resonant Circulator"***, *IEEE MEMS 2019*, Seoul, South Korea, January 27-31, 2019, pg. 125-128.

C17. P. Kulik, Y. Yu, G. Chen and **M. Rinaldi**, ***"Highly Linear Magnetic-free Isolator Based on a Time-Modulated Differential RF MEMS Lattice Filter"***, *IEEE MEMS 2019*, Seoul, South Korea, January 27-31, 2019, pg. 871-874.

C18. S. Kang, Z. Qian, V. Rajaram, S. Calisgan and **M. Rinaldi**, ***"Chip-scale MEMS-CMOS Multispectral Infrared Chemical Sensor"***, *IEEE MEMS 2019*, Seoul, South Korea, January 27-31, 2019, pg. 133-136. **[Winner of the Outstanding Paper Award]**

C19. B. Herrera, F. V. Pop, C. Cassella and **M. Rinaldi**, ***"Frequency Agile PMUT-based Ultrasonic Communication Links"***, *IEEE MEMS 2019*, Seoul, South Korea, January 27-31, 2019, pg. 974-977.

C20. F. V. Pop, B. Herrera, C. Cassella and **M. Rinaldi**, ***"Direct Modulation Piezoelectric Micro-machined Ultrasonic Transducer System (DMUT)"***, *IEEE MEMS 2019*, Seoul, South Korea, January 27-31, 2019, pg. 61-64.

C21. V. Rajaram, Z. Qian, S. Kang, S. Calisgan, and **M. Rinaldi**, ***"MEMS-Based Battery-less RFID Infrared Sensor Tag With Memory Function"***, *IEEE MEMS 2019*, Seoul, South Korea, January 27-31, 2019, pg. 266-269.

C22. V. Rajaram, Z. Qian, S. Kang, S. Calisgan, N. McGruer and **M. Rinaldi**, *"**A False Alarm-Free Zero-Power Micromechanical Photoswitch**"*, *IEEE Sensors (SENSORS 2018)*, New Delhi, India, October 28-31, 2018, doi: 10.1109/ICSENS.2018.8589915.

C23. S. Calisgan, V. Villanueva-Lopez, V. Rajaram, Z. Qian, S. Kang, S. Hernandez-Rivera, and **M. Rinaldi**, *"**Spectroscopic Chemical Sensing Based on Narrowband MEMS Resonant Infrared Detectors**"*, *IEEE Sensors (SENSORS 2018)*, New Delhi, India, October 28-31, doi: 10.1109/ICSENS.2018.8589600.

C24. Flavius Pop, Bernard Herrera, Guofeng Chen, Emrecan Demirors, Raffaele Guida, Cristian Cassella, Tommaso Melodia and **Matteo Rinaldi**, *"**Novel pMUT-Based Acoustic Duplexer for Underwater and Intra-Body Communication**"*, *IEEE International Ultrasonics Symposium (IUS) 2018*, Kobe, Japan, October 22-25, doi: 10.1109/ULTSYM.2018.8579709. ***[Nominated for Best Student Paper Award]***

C25. Giuseppe Michetti, Cristian Cassella, Flavius Pop, Kord Ahmed, Sounas Dimitrios, Andrea Alù and **Matteo Rinaldi**, *"**A Quasi-LTI Frequency-Selective SAW Circulator**"*, *IEEE International Ultrasonics Symposium (IUS) 2018*, Kobe, Japan, October 22-25, doi: 10.1109/ULTSYM.2018.8579721. ***[Nominated for Best Student Paper Award]***

C26. Michele Pirro, Cristian Cassella, Piotr Kulik, Giuseppe Michetti, Yao Yu, Guofeng Chen and **Matteo Rinaldi**, *"**Novel topology for a non-reciprocal MEMS filter**"*, *IEEE International Ultrasonics Symposium (IUS) 2018*, Kobe, Japan, October 22-25, 2018, doi: 10.1109/ULTSYM.2018.8580092.

C27. C. Cassella, M. Assylbekova, W. Z. Zhu, G. Chen, P. Kulik, G. Michetti, N. McGruer and **M. Rinaldi**, ***"750 MHz Zero-Power MEMS-Based Wake-Up Receiver with -60 dBm Sensitivity"***, *Hilton Head Workshop 2018: A Solid-State Sensors, Actuators and Microsystems Workshop*, Hilton Head Island, June 3-7, 2018, pg. 362-363, DOI 10.31438/trf.hh2018.101.

C28. B. Herrera, E. Demirors, G. Chen, F. Pop, R. Guida, N. Dave, C. Cassella, T. Melodia, and **M. Rinaldi**, ***"PMUT-Based High Data Rate Ultrasonic Wireless Communication Link for Intra-Body Networks"***, *Hilton Head Workshop 2018: A Solid-State Sensors, Actuators and Microsystems Workshop*, Hilton Head Island, June 3-7, 2018.

C29. S. Kang, S. Calisgan, Z. Qian, V. Rajaram, N. McGruer and **M. Rinaldi**, ***"Broadband Long-Wavelength Infrared Micromechanical Photoswitch for Zero-Power Human Detection"***, *Hilton Head Workshop 2018: A Solid-State Sensors, Actuators and Microsystems Workshop*, Hilton Head Island, June 3-7, 2018, pg. 187-189, DOI 10.31438/trf.hh2018.52.

C30. Y. Yu, F. Pop, G. Michetti, P. Kulik, M. Pirro, A. Kord, D. Sounas, A. Alu and **M. Rinaldi**, ***"2.5 GHz Highly-Linear Magnetic-Free Microelectromechanical Resonant Circulator"***, *Proceedings of the 2018 IEEE International Frequency Control Symposium (IFCS 2018)*, Olympic Valley, CA, May 21-24, 2018. **[Nominated for Best Student Paper Award]**.

C31. C. Cassella, and **M. Rinaldi**, ***"On the Origin of High Coupling Two-Dimensional Modes of Vibration in Aluminum Nitride Plates"***, *Proceedings of the 2018 IEEE International Frequency Control Symposium (IFCS 2018)*, Olympic Valley, CA, May 21-24, 2018, doi: 10.1109/FCS.2018.8597568.

C32. Z. Qian, and **M. Rinaldi**, ***"Effects of Bottom Electrode Topography in AlN Nano Plate Resonators on Quality Factor"***, *Proceedings of the 2018 IEEE International Frequency Control Symposium (IFCS 2018)*, Olympic Valley, CA, May 21-24, 2018, doi: 10.1109/FCS.2018.8597458.

C33. Y. Yu, G. Michetti, A. Kord, D. Sounas, F. Pop, P. Kulik, M. Pirro, Z. Qian, A. Alu' and **M. Rinaldi**, ***"Magnetic-Free Radio Frequency Circulator Based on Spatiotemporal Modulation of MEMS Resonators"***, *Proceedings of the 31st IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2018), Belfast, Northern Ireland, 21-25 January 2018*, pg. 154-157 **[Nominated for Outstanding Paper Award]**.

C34. V. Rajaram, Z. Qian, S. Kang and **M. Rinaldi**, ***"MEMS-Based Near-Zero Power Infrared Wireless Sensor Node"***, *Proceedings of the 31st IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2018), Belfast, Northern Ireland, 21-25 January 2018*, pg. 17-20.

C35. G. Chen, C. Cassella, T. Wu and **M. Rinaldi**, ***"Single-Chip Multi-Frequency Wideband Filters Based on Aluminum Nitride Cross-Sectional Lame' Mode Resonators with Thick and Apodized Electrodes"***, *Proceedings of the 31st IEEE International Conference on Micro*

Electro Mechanical Systems (MEMS 2018), Belfast, Northern Ireland, 21-25 January 2018, pg. 775-778.

C36. T. Wu, Z. Qian and **M. Rinaldi**, ***"Low Cost Thin Film Encapsulation for AlN Resonators"***, *Proceedings of the 31st IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2018), Belfast, Northern Ireland, 21-25 January 2018*, pg. 1024-1027.

C37. V. Rajaram, Z. Qian, S. Kang, N. McGruer and **M. Rinaldi**, ***"Threshold Scaling of Near-Zero Power Micromechanical Photoswitches Using Bias Voltage"***, *Proceeding of the IEEE Sensors 2017 Conference (Sensors 2017), Glasgow, UK, Oct 29 – Nov 1 2017*, doi: 10.1109/ICSENS.2017.8234276. **[Nominated for Best Student Paper Award]**.

C38. T. Wu, G. Chen, C. Cassella, W. Zhu, *M. Assylbekova,* **M. Rinaldi** and N. McGruer, ***"Design and Fabrication of AlN RF MEMS Switch for Near-Zero Power RF Wake-Up Receivers"***, *Proceeding of the IEEE Sensors 2017 Conference (Sensors 2017), Glasgow, UK, Oct 29 – Nov 1 2017*, doi: 10.1109/ICSENS.2017.8234413.

C39. Z. Qian, V. Rajaram, S. Kang and **M. Rinaldi**, ***"NEMS Infrared Detectors based on High Quality Factor 50 nm Thick AlN Nano-Plate Resonators"***, *proceedings of the IEEE International Frequency Control Symposium (IFCS 2017)*, July 10-13 2017, Besancon, France, doi: 10.1109/FCS.2017.8088941. **[Winner of the Best Student Paper Award]**.

C40. V. Rajaram, Z. Qian, S. Kang, C. Cassella, N. McGruer and **M. Rinaldi**, ***"Microelectromechanical Detector of Infrared Spectral Signatures with Near-Zero Standby Power Consumption"***, *Proceedings of the 19th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2017),* June 18-22 2017, Kaohsiung, Taiwan, pp. 846-849. doi: 10.1109/TRANSDUCERS.2017.7994181.

C41. T. Wu, G. Chen, Z. Qian, W. Zhu, **M. Rinaldi**, and N. McGruer, ***"A Microelectromechanical AlN Resoswitch for RF Receiver Application"***, *Proceedings of the 19th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2017),* June 18-22 2017, Kaohsiung, Taiwan, pp. 2123-2126. doi: 10.1109/TRANSDUCERS.2017.7994494.

C42. S. Kang, Z. Qian, V. Rajaram, A. Alu' and **M. Rinaldi**, ***"Ultra Narrowband Infrared Absorbers for Omni-Directional and Polarization Insensitive Multi-Spectral Sensing Micro-Systems"***, *Proceedings of the 19th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2017),* June 18-22 2017, Kaohsiung, Taiwan, pp. 886-889. doi: 10.1109/TRANSDUCERS.2017.7994191.

C43. C. Cassella, G. Chen, T. Wu and **M. Rinaldi**, ***"Low Impedance Array of Coupled Cross-Sectional Lame' Mode Resonators with High Figure of Merit in Excess of 100"***, *Proceedings of the 19th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2017),* June 18-22 2017, Kaohsiung, Taiwan, pp. 1935-1838. doi: 10.1109/TRANSDUCERS.2017.7994447.

C44. C. Cassella, T. Wu, G. Chen, W. Zhu. G. Hummel, N. McGruer and M. Rinaldi, ***"Fully Passive Microelectromechanical Near Zero Power Wake Up Receiver for Ultra-Low Power Applications"***, *Proceedings of the 40th Annual GOMACTech Conference*, Reno, NV,

USA, March 20-23, 2017, pg. 108-111.

C45. Z. Qian, S. Kang, V. Rajaram, C. Cassella, N. McGruer and M. Rinaldi, ***"Light-actuated Micromechanical Relays for Zero-Power Infrared Detection"***, *Proceedings of the 40th Annual GOMACTech Conference*, Reno, NV, USA, March 20-23, 2017, pg. 112-115.

C46. Z. Qian, S. Kang, V. Rajaram, C. Cassella, N. McGruer and **M. Rinaldi**, ***"Zero-Power Light-Actuated Micromechanical Relay"***, *Proceedings of the 30th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2017), Las Vegas, USA, 22-26 January 2017*, *pp. 940-941, doi: 10.1109/MEMSYS.2017.7863564*.

C47. Z. Qian, S. Kang, V. Rajaram and **M. Rinaldi**, ***"Narrowband MEMS Resonant Infrared Detectors based on Ultrathin Perfect Plasmonic Absorbers"***, *Proceeding of the IEEE Sensors 2016 Conference (Sensors 2016), Orlando, FL, USA, Oct 30 – Nov 2 2016, pp. 1-3, doi: 10.1109/ICSENS.2016.7808614* [**Nominated for Best Student Paper Award**].

C48. Z. Qian, S. Kang, V. Rajaram and **M. Rinaldi**, ***"50 nm Thick Aluminum Nitride Piezoelectric Nano-Plate Resonant Thermal Detectors"***, *Proceeding of Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop*, *pp. 58-59*.

C49. C. Cassella, G. Chen, Z. Qian, G. Hummel and **M. Rinaldi**, ***"Unprecedented Figure of Merit in Excess of 108 in 920 MHz Aluminum Nitride Cross-Sectional Lamé Mode Resonators Showing k_t^2 in Excess of 6.2%"***, *Proceeding of Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop*, *pp. 94-96*.

C50. C. Cassella, G. Chen, Z. Qian, G. Hummel and **M. Rinaldi**, ***"920 MHz Aluminum Nitride Cross-Sectional Lamé Mode Piezoelectric MEMS Transformer with High Open-Circuit Voltage Gain in Excess of 39"***, *Proceedings of the Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop*, *pp. 412-415*.

C51. C. Cassella, G. Chen, Z. Qian, G. Hummel and **M. Rinaldi**, ***"Cross-Sectional Lamé Mode Filters for UHF Wideband Applications"***, *Proceedings of the IEEE International Frequency Control Symposium (IFCS 2016)*, *pp. 1-3, doi: 10.1109/FCS.2016.7546798*.

C52. G. Chen, C. Cassella, Z. Qian, G. Hummel and **M. Rinaldi**, ***"Aluminum Nitride Cross-Sectional Lamé Mode Resonators with 260 MHz Lithographic Tuning Capability and High kt2>4%"***, *Proceedings of the IEEE International Frequency Control Symposium (IFCS 2016)*, *pp. 1 - 3, doi: 10.1109/FCS.2016.7563549*.

C53. Z. Qian, Y. Hui and **M. Rinaldi**, ***"Effects of Volume Scaling in AlN Nano Plate Resonators on Quality Factor"***, *proceedings of the IEEE International Frequency Control Symposium (IFCS 2016)*, *pp. 1-3, doi: 10.1109/FCS.2016.7563552.*

C54. C. Cassella and **M. Rinaldi**, ***"Cross-Sectional Lamé Mode Contiguous Filters For Next-Generation LTE-Advanced Platforms"***, *Proceeding of the IEEE International Microwave Symposium (IMS 2016)*, *San Francisco, California, May 22-27, pp. 1-3, doi: 10.1109/MWSYM.2016.7540108* [**Invited paper**].

C55. H. Lin, T. Nan, Z. Qian, Y. Gao, Y. Hui, X. Wang, R. Guo, A. Belkessam, W. Shi, M. Rinaldi, N. Sun, ***"Tunable RF band-pass filters based on NEMS magnetoelectric resonators"***, *Proceeding of the IEEE International Microwave Symposium (IMS 2016)*, *San Francisco, California, May 22-27, 2016, pp. 1-4, doi: 10.1109/MWSYM.2016.7540335*.

C56. C. Cassella, Z. Qian, G. Hummel, and **M. Rinaldi**, ***"1.02 GHz Aluminum Nitride Cross-Sectional Lame' Mode Resonator with High k_t^2 Exceeding 4.6%"***, *Proceedings of the 29th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2016), Shanghai, China, 24-28 January 2016*, *pp. 659-662*.

C57. Z. Qian, Y. Hui, F. Liu, S. Kar and **M. Rinaldi**, ***"Chemical Sensing based on Graphene-Aluminum Nitride Nano Plate Resonators"***, *Proceedings of the IEEE Sensors 2015 Conference,* Busan, Korea, November 1-4, 2015, *pp. 1-4. doi: 10.1109/ICSENS.2015.7370507*.

C58. Y. Hui, J. S. Gomez-Diaz, A. Alu' and **M. Rinaldi**, ***"Spectrally Selective Infrared Detector based on a Plasmonic Piezoelectric Nanoelectromechanical Metasurface"***, *Proceedings of the Ninth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics (Metamaterials 2015),* Oxford, UK, September 7-10, 2015, *pp. 1062-1064*.

C59. Z. Qian, Y. Hui, F. Liu, S. Kar and **M. Rinaldi**, ***"1.27 GHz Graphene-Aluminum Nitride Nano Plate Resonant Infrared Detector"***, *Proceedings of the 18th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2015),* Anchorage, Alaska, June 21-25, 2015, pp. 1429-1432 [**Winner of the Outstanding Paper Award**].

C60. G. Hummel, Y. Hui and **M. Rinaldi**, ***"Highly Reconfigurable Aluminum Nitride MEMS Resonator Using 12 Monolithically Integrated Phase Change Material Switches"***, *Proceedings of the 18th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2015),* Anchorage, Alaska, June 21-25, 2015, pp. 323-326.

C61. G. Hummel and **M. Rinaldi**, ***"Switchable 2-Port Aluminum Nitride MEMS Resonator Using Monolithically Integrated 3.6 THz Cut-Off Frequency Phase-Change Switches"***, *Proceedings of the 2015 IEEE International Frequency Control Symposium (IFCS 2015)*, Denver, USA, April 12-16, 2015, pp. 706-708. [**Winner of the Best Student Paper Award**].

C62. Z. Qian, Y. Hui, F. Liu, S. Kar and **M. Rinaldi**, ***"GHz Range Graphene-Aluminum Nitride Nano Plate Resonators"***, *Proceedings of the 2015 IEEE International Frequency Control Symposium (IFCS 2015)*, Denver, USA, April 12-16, 2015, in press. [**Nominated for Best Student Paper Award**].

C63. Y. Hui, Z. Qian and **M. Rinaldi**, ***"Resonant Infrared Detector Based on a Piezoelectric Fishnet Metasurface"***, *Proceedings of the 2015 IEEE International Frequency Control Symposium (IFCS 2015)*, Denver, USA, April 12-16, 2015, pp. 630-632. [**Nominated for Best Student Paper Award**].

C64. Y. Hui and **M. Rinaldi**, ***"Spectrally selective infrared detector based on an ultra-thin piezoelectric resonant metamaterial"***, *Proceedings of the 28th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2015), Estoril, Portugal, 18-22 January 2015*, pp. 984-987.

C65. G. Hummel, Y. Hui and **M. Rinaldi**, ***"Switching and Reconfiguration of Aluminum Nitride RF MEMS Resonators Using Phase Change Materials"***, *Proceedings of the 40th Annual GOMACTech Conference*, St. Louis, MO, USA, March 23-26, 2015.

C66. Z. Qian, R. Vyas, Y. Hui and **M. Rinaldi**, ***"High Resolution Calorimetric Sensing Based on Aluminum Nitride MEMS Resonant Thermal Detectors"***, *Proceedings of the 2014 IEEE Sensors Conference,* Valencia, Spain, November 2-5, 2014, pg. 986-989.

C67. G. Hummel, Y. Hui and **M. Rinaldi**, ***"Reconfigurable Mode of Vibration in AlN MEMS Resonators Using Phase Change Materials"***, *Proceedings of the 2014 IEEE International Ultrasonic Symposium (IUS 2014)*, Chicago, USA, September 3-6, 2014, pg. 799-802.

C68. G. Hummel, Y. Hui and **M. Rinaldi**, ***"Phase Change Material Programmable Vias for Switching and Reconfiguration of Aluminum Nitride Piezoelectric MEMS Resonators "***, *Proceedings of the 2014 IEEE International Frequency Control Symposium (IFCS 2014)*, Taipei, Taiwan, May 19-22, 2014, pp.1,3, doi: 10.1109/FCS.2014.6859996. [**Nominated for Best Student Paper Award**].

C69. Y. Hui, T. X. Nan, N. X. Sun and **M. Rinaldi**, ***"Ultra-Sensitive Magnetic Field Sensor Based on a Low-Noise Magnetoelectric MEMS-CMOS Oscillator"***, *Proceedings of the 2014 IEEE International Frequency Control Symposium (IFCS 2014)*, Taipei, Taiwan, May 19-22, 2014, pp.1,3, doi: 10.1109/FCS.2014.6859915. [**Nominated for Best Student Paper Award**]

C70. G. Hummel, Y. Hui, Z. Qian and **M. Rinaldi**, ***"Switchable Aluminum Nitride MEMS Resonator Using Phase Change Materials"***, *Proceedings of the 2014 Solid-State Sensors,*

Actuators and Microsystems Workshop (Hilton Head 2014), Hilton Head Island, 8-12 June 2014, pg. 431-434.

C71. Y. Hui, Z Qian, G. Hummel and **M. Rinaldi,** ***"Pico-Watts Range Uncooled Infrared Detector Based on a Freestanding Piezoelectric Resonant Microplate with Nanoscale Metal Anchors"***, *Proceedings of the 2014 Solid-State Sensors, Actuators and Microsystems Workshop (Hilton Head 2014), Hilton Head Island, 8-12 June 2014*, pg. 387-390.

C72. Y. Hui, Z. Qian and **M. Rinaldi**, ***"A 2.8 GHz Combined Mode of Vibration Aluminum Nitride MEMS Resonator with High Figure of Merit Exceeding 45"***, *Proceedings of the 2013 IEEE International Frequency Control Symposium (IFCS 2013)*, Prague, Czech Republic, July 21-25, 2013, pg. 930-932, [**Nominated for Best Student Paper Award**].

C73. Y. Hui and **M. Rinaldi**, ***"Aluminum Nitride Nano-Plate Resonant Infrared Sensor with Self-Sustained CMOS Oscillator for Nano-Watts Range Power Detection"***, *Proceedings of the 2013 IEEE International Frequency Control Symposium (IFCS 2013)*, Prague, Czech Republic, July 21-25, 2013, pg. 62-65.

C74. Z. Qian, Y. Hui, F. Liu, S. Kar and **M. Rinaldi**, ***"Single Transistor Oscillator Based on a Graphene-Aluminum Nitride Nano Plate Resonator"***, *Proceedings of the 2013 IEEE International Frequency Control Symposium (IFCS 2013)*, Prague, Czech Republic, July 21-25, 2013, pg. 559-561.

C75. Z. Qian, Y. Hui, F. Liu, S. Kar and **M. Rinaldi**, ***"245 MHz Graphene-Aluminum Nitride Nano Plate Resonator"***, *Proceedings of the 17th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2013)*, Barcelona, Spain, 16-20 June 2013, pg. 2005-2008.

C76. Y. Hui and **M. Rinaldi**, ***"High Performance NEMS Resonant Infrared Detector Based on an Aluminum Nitride Nano Plate Resonator"***, *Proceedings of the 17th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2013)*, Barcelona, Spain, 16-20 June 2013, pg. 968-971.

C77. Y. Hui, T. X. Nan, N. X. Sun and **M. Rinaldi**, ***"MEMS Resonant Magnetic Field Sensor Based on an AlN/FeGaB Bilayer Nano-Plate Resonator"***, *Proceedings of the 26th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2013)*, Taipei, Taiwan, 20-24 January 2013, pp. 721-724 [**Nominated for *Outstanding Paper Award***].

C78. Y. Hui and **M. Rinaldi**, ***"Ultra-Fast and High Resolution NEMS Thermal Detector Based on a Nano-Air-Gap Piezoelectric Resonant Structure"***, *Proceedings of the IEEE Sensors 2012 Conference,* Taipei, Taiwan, 28-31 October 2012, pp. 1983-1986 [**Late News Paper**].

C79. A. Tazzoli, N. Kuo, **M. Rinaldi**, H. Pak, D. Fry, D. Bail, D. Stevens, and G. Piazza, ***"A 586 MHz Microcontroller Compensated MEMS Oscillator based on Ovenized Aluminum***

Nitride Contour-Mode Resonators", *Proceedings of the IEEE International Ultrasonics Symposium (IUS) 2012,* Dresden, Germany, 7-10 October 2012, pg. 1055-1058.

C80. **M. Rinaldi**, A. Tazzoli, C. Zuniga, G. Piazza, ***"970 MHz Ovenized Oscillator Based on an ALN MEMS Resonator with Monolithically Integrated Suspended Nano Hot Plate"***, *Proceedings of the 2012 Solid-State Sensors, Actuators and Microsystems Workshop (Hilton Head 2012),* Hilton Head Island, 3-7 June 2012, pp. 347-350.

C81. C. Zuniga, **M. Rinaldi**, A. Tazzoli, G. Piazza, ***"Single Transistor Oscillator Based on Piezoelectric Resonant Nanochannel for Operation in Liquids"***, *Proceedings of the 2012 Solid-State Sensors, Actuators and Microsystems Workshop (Hilton Head 2012),* Hilton Head Island, 3-7 June 2012, 367-370.

C82. **M. Rinaldi,** Y. Hui, C. Zuniga, A. Tazzoli, G. Piazza, ***"High Frequency AlN MEMS Resonators with Integrated Nano Hot Plate for Temperature Controlled Operation"***, *Proceedings of the IEEE International Frequency Control Symposium (IFCS) 2012*, Baltimore, USA, May 21-24, 2012, pp. 1-5.

C83. A. Tazzoli**, M. Rinaldi,** G. Piazza, ***"Ultra High Frequency Temperature Compensated Oscillators Based on Ovenized AlN Contour-Mode MEMS Resonators"***, *Proceedings of the IEEE International Frequency Control Symposium (IFCS) 2012*, Baltimore, USA, May 21-24, 2012, pp. 1-5.

C84. A. Tazzoli, G. Piazza, **M. Rinaldi**, J. Segovia, C. Cassella, B. Otis, J. Shi, K. Turner, C. Burgner, K. McNaul, D. Bail, and V. Felmetsger, ***"Piezoelectric Nonlinear Nanomechanical Temperature and Acceleration Insensitive Clocks"***, *Proceeding of SPIE 8373*, 83730A, Baltimore, USA, April 23, 2012.

C85. **M. Rinaldi,** A. Tazzoli**,** J. Segovia-Fernandez, V. Felmetsger and G. Piazza, ***"High Power and Low Temperature Coefficient of Frequency Oscillator Based on a Fully Anchored and Oxide Compensated AlN Contour-Mode MEMS Resonator"***, *Proceedings of the 25th IEEE Conference on Micro Electro Mechanical Systems (MEMS 2012)*, Paris, France, 29 January – 2 February 2012, pp. 696-699.

C86. A. Tazzoli**, M. Rinaldi,** G. Piazza, ***"Ovenized High Frequency Oscillators Based on Aluminum Nitride Contour-Mode MEMS Resonators"***, *Proceedings of the IEEE International Electron Devices Meeting (IEDM) 2011*, Washington, USA, December 5-7, 2011, pp. 20.2.1-20.2.4.

C87. A. Tazzoli**, M. Rinaldi,** C. Zuo, N. Sinha, J. Van der Spiegel, G. Piazza, ***"Aluminum Nitride Reconfigurable RF-MEMS Front-Ends"***, *Proceedings of the IEEE 9th International Conference on ASIC (ASICON 2011)*, Xiamen, China, October 25-28, 2011, pp. 1046-1049 [**invited paper**].

C88. J. Segovia-Fernandez, A. Tazzoli, **M. Rinaldi**, and G. Piazza, ***"Nonlinear Lumped Electrical Model for Contour Mode AlN Resonators"***, *Proceedings of the IEEE International Ultrasonics Symposium (IUS) 2011,* Orlando, USA, 18-21 October 2011, 1846-1849.

C89. **M. Rinaldi** and G. Piazza, ***" Effects of Volume and Frequency Scaling in AlN Contour Mode NEMS Resonators on Oscillator Phase Noise"***, *Proceedings of the IEEE International Frequency Control Symposium 2011*, San Francisco, USA, 1-5 May 2011, pp. 1-5, [**Winner of the Best Student Paper Award**].

C90. **M. Rinaldi**, C. Zuniga and G. Piazza, ***"ss-DNA Functionalized Array of AlN Contour-Mode NEMS Resonant Sensors with Single CMOS Multiplexed Oscillator for sub-ppb Detection of Volatile Organic Chemicals "***, *Proceedings of the 24th IEEE Conference on Micro Electro Mechanical Systems (MEMS 2011)*, Cancun, Mexico, 23-27 January 2011, pp. 976-979.

C91. C. Zuniga, **M. Rinaldi** and G. Piazza, ***"Reduced Viscous Damping in High Frequency Piezoelectric Resonant Nanochannels for Sensing in Fluids"***, *Proceedings of the 24th IEEE Conference on Micro Electro Mechanical Systems (MEMS 2011)*, Cancun, Mexico, 23-27 January 2011, pp. 960-963.

C92. **M. Rinaldi**, C. Zuniga, B. Duick, and G. Piazza, ***"Use of a Single Multiplexed CMOS Oscillator As Direct Frequency Read-Out for an Array of Eight AlN Contour-Mode NEMS Resonant Sensors"***, *Proceedings of the IEEE Sensors Conference 2010,* Waikoloa, Hawaii, USA, 1-4 November 2010, pp. 2666-2670.

C93. C. Zuniga, **M. Rinaldi**, and G. Piazza, ***"High Frequency Piezoelectric Resonant Nanochannel for Bio-Sensing Applications in Liquid Environment"***, *Proceedings of the IEEE Sensors Conference 2010,* Waikoloa, Hawaii, USA, 1-4 November 2010, pp. 52-55.

C94. G. Piazza, **M. Rinaldi**, C. Zuniga, ***"Nanoscaled Piezoelectric Aluminum Nitride Contour-Mode Resonant Sensors"***, *Proceedings of the IEEE Sensors Conference 2010,* Waikoloa, Hawaii, USA, 1-4 November 2010, pp. 2202-2207 [**invited paper**].

C95. **M. Rinaldi**, C. Zuo, J. Van der Spiegel and G. Piazza, ***"Reconfigurable 4-Frequency CMOS Oscillator Based on AlN Contour-Mode MEMS Resonators"***, *Proceedings of the IEEE International Ultrasonics Symposium 2010,* San Diego, USA, 11-14 October 2010, in press [**nominated for *Best Student Paper Award***].

C96. **M. Rinaldi**, C. Zuniga, C. Zuo and G. Piazza, ***"GHz Range Nanoscaled AlN Contour-Mode Resonant Sensors (CMR-S) with Self-Sustained CMOS Oscillator"***, *Proceedings of the Solid-State Sensors, Actuators and Microsystems Workshop (Hilton Head 2010),* Hilton Head Island, 06-10 June 2010, pp. 471-474.

C97. **M. Rinaldi**, B. Duick, C. Zuniga, C. Zuo and G. Piazza, ***"ss-DNA Functionalized Ultra-Thin-Film AlN Contour-Mode Resonators with Self-Sustained Oscillator for Volatile Organic Chemical Detection"***, *Proceedings of the 23rd IEEE Conference on Micro Electro Mechanical Systems (MEMS 2010)*, Hong Kong SAR, China, 24-28 January 2010, pp. 132-135.

C98. **M. Rinaldi**, C. Zuniga and G. Piazza, ***"Ultra-Thin-Film AlN Contour-Mode Resonators for Sensing Applications"***, *Proceedings of the IEEE International Ultrasonics Symposium 2009,* Rome, Italy, 20-23 September 2009, pp. 714-717.

C99. C. Zuniga, **M. Rinaldi** and G. Piazza, ***"Quality Factor of MEMS and NEMS AlN Contour-Mode Resonators in Liquid Media"***, *Proceedings of the IEEE International Ultrasonics Symposium 2009*, Rome, Italy, 20-23 September 2009, pp. 2568-2571.

C100. C. Zuo, **M. Rinaldi** and G. Piazza, ***"Power Handling and Related Frequency Scaling Advantages in Piezoelectric AlN Contour-Mode MEMS Resonators"***, *Proceedings of the IEEE International Ultrasonics Symposium 2009*, Rome, Italy, 20-23 September 2009, pp. 1187-1190.

C101. **M. Rinaldi**, C. Zuniga, C. Zuo, and G. Piazza, ***"AlN Contour-Mode Resonators for Narrow-Band Filters above 3 GHz"***, *Proceedings of the IEEE International Frequency Control Symposium 2009*, Besancon, France, 20-24 April 2009, pg. 70-74 [**Winner of the *Best Student Paper Award***].

C102. **M. Rinaldi**, C. Zuniga, C. Zuo, and G. Piazza, ***"Ultra-Thin Super High Frequency two-port AlN Contour-Mode Resonators and Filters"***, *Proceedings of the 15th International Conference on Solid-State Sensors, Actuators and Microsystems (Tranducers 2009)*, Denver, Colorado, USA, 21-25 June 2009, pg. 577-580.

C103. **M. Rinaldi**, C. Zuniga, and G. Piazza, ***"5-10 GHz AlN Contour-Mode Nanoelectromechanical Resonators"***, *Proceedings of the 22nd IEEE Conference on Micro Electro Mechanical Systems (MEMS 2009)*, Sorrento, Italy, 24-28 January 2009, pg. 916-919.

C104. C. Zuniga, **M. Rinaldi**, S. M. Khamis, T. S. Jones, A. T. Johnson, and G. Piazza, ***"*DNA-Decorated Carbon Nanotubes as Sensitive Layer for AlN Contour-Mode Resonant-MEMS Gravimetric Sensor*"***, *Proceedings of the 22nd IEEE Conference on Micro Electro Mechanical Systems (MEMS 2009)*, Sorrento, Italy, 24-28 January 2009, pg. 320-323.

C105. **M. Rinaldi**, C. Zuniga, N. Sinha, M. Taheri, S. M. Khamis, A. T. Johnson, and G. Piazza, ***"Gravimetric Chemical Sensor Based on the Direct Integration of SWNTs on AlN Contour-Mode MEMS Resonators"***, *Proceedings of the IEEE International Frequency Control Symposium 2008*, Honolulu, Hawaii, USA, 18-21 May 2008, pg, 443-448 [**nominated for *Best Student Paper Award***].

THESIS DISSERTATIONS

D1. **M. Rinaldi**, *"Piezoelectric Aluminum Nitride Nano Plate Resonant Sensors for Next Generation Miniaturized Sensing Platforms",* Ph.D. thesis dissertation in Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, USA, December 2010.

D2. **M. Rinaldi**, *"Micromachined Hydrogen sensors based on the variation of Work Function and interface circuits",* Second Level Laurea (M.Sc.) thesis dissertation in Electronic Engineering, University of Rome "Tor Vergata", Rome, Italy, May 2007.

D3. **M. Rinaldi**, *"Fabrication and characterization of Carbon Nanotube based poly(1,8-dan) and poly(orto-anisidina) nanocomposed films for Organic Electronic Devices",* First Level Laurea (B.Sc.) thesis dissertation in Electronic Engineering, University of Rome "Tor Vergata", Rome, Italy, October 2004.

PATENTS AND DISCLOSURES

Awarded:

P1. J. J. Bernstein, M. S. Weinberg, A. Duwel, P. A. Ward, N. E. McGruer, **M. Rinaldi**, E. H. Cook,*"Zero Power Sensors"*, United States Patent 10,345,332; July 9, 2019.

P2. **M. Rinaldi**, G. Hummel, *"Piezoelectric MEMS Resonator Technology with Integrated Phase Change Material Switches"*, US Patent Application No. 15/304,919, allowed May 21, 2019.

P3. N. Sun, **M. Rinaldi**, T. Nan, Y. Hui, *"Systems and Methods for Magnetic Field Detection"*, US Patent Application No. 14/771,460, allowed December 21, 2017.

P4. **M. Rinaldi**, N. McGruer, A. Duwel, M. Weinberg, R. Egri, C. Cassella *"Zero Power Radio Frequency Receiver"*, United States Patent 9,787,340; October 10, 2017.

P5. **M. Rinaldi**, C. Cassella, Z. Qian, Y. Hui *"Nano- and Micro-Electromechanical Resonators"*, United States Patent 9,712,136; July 18 2017.

P6. **M. Rinaldi**, Z. Qian, Y. Hui *"Nano- and Micro-Electromechanical Resonators"*, United States Patent 9,705,469; July 11 2017.

P7. C. Zuniga, **M. Rinaldi**, G. Piazza *"Devices and Methods for Gravimetric Sensing in Liquid Environments"*, United States Patent 9,638,616 B2; May 2 2017.

P8. **M. Rinaldi**, C. Cassella, Z. Qian, Y. Hui *"Nano- and Micro-Electromechanical Resonators"*, United States Patent 9,419,583; August 16 2016.

P9. **M. Rinaldi**, Z. Qian, Y. Hui *"Nano- and Micro-Electromechanical Resonators"*, United States Patent 9,425,765; August 23 2016.

Pending:

P1. **M. Rinaldi**, C. Cassella, Z. Qian, Y. Hui *"Nano- and Micro-Electromechanical Resonators"*, US Continuation application 15/652,954; July 2017.

P2. **M. Rinaldi**, C. Cassella, A. Alu', D. Sounas, A. Kord *"Microelectromechanical Resonant Circulator (MIRC)"*, US Patent Application: 15/812,296 filed in November 2017.

P3. **M. Rinaldi**, C. Cassella *"Piezoelectric Cross-Sectional Lame Mode Transformer"*, PCT/ US16/56447, filed in October 2016.

P4. **M. Rinaldi**, Z. Qian, Y. Hui, V. Rajaram, *"Zero-power Plasmonic Microelectromechanical Infrared Digitizer"*, PCT/US/16/048083, filed in August 2016, US Application 15/753,059, filed in February 2018.

P5. **M. Rinaldi**, Y. Hui, *"Plasmonic Piezoelectric Resonator for Spectrally Selective Infrared/Terahertz Sensing"*, US Provisional Patent Application: 62/132,755, filed in March 2015.

P6. N. Sun, **M. Rinaldi**, T. Nan, Y. Hui, *"Systems and Methods for Magnetic Field Detection"*, US Patent Application No. 14/771,460, August 2015.

P7. **M. Rinaldi**, Y. Hui, *"Ovenized Piezoelectric Resonators with Monotonically Integrated Suspended Heater"*, U.S. Provisional Application No. 61/661,679, filed in June 2012.

P8. A. Tazzoli, **M. Rinaldi**, G. Piazza, *"Ovenized High Frequency Oscillators Based on AlN Contour-Mode MEMS Resonators"*, United States Provisional Patent Application 61/505,182, filed in July 2011.

P9. C. Zuniga, **M. Rinaldi**, G. Piazza, *"Devices and methods for gravimetric sensing in liquid environments"*, US20130330835 A1, US 13/882,611, PCT/US2011/058712, December 2013.

P10. G. Piazza, A. T. Johnson, **M. Rinaldi**, C. Zuniga, *"System and Method for Detecting a Gaseous Analyte in a Gas",* US20100190270 A1, US 12/693,046, July 2010.

PROFESSIONAL ACTIVITIES

LEADERSHIP POSITIONS

- **Administrative Committees (AdCom):**
  - *Member – IEEE MEMS Technical Community, since 2019.*

  - *Publicity Chair - IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society, 2016-2018.*
  - *Elected Member - IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society, 2013-2015.*
- **Standing Committees:**
  - *Member - IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society - Standing Committee for Frequency Control, 2013-2019.*
- **Scientific Boards:**
  - *Member - Scientific Board of the PhD program in Bioengineering and Bioscience at the Campus Bio-Medico University of Rome, Italy, since 2016.*
- **Other Committees:**
  - *Member - IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society - Nomination Committee, since 2018.*
  - *Member - IEEE Sensors Council Award Committee, since 2017.*
  - *Member - IEEE Sensors Council Young Professionals Program Committee, since 2016.*
  - *Member - IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society - Membership Committee, 2016 -2017.*
- **Chair/Organizer of:**
  - *TPC Chair - IEEE Frequency Control Symposium 2020.*
  - *Short Course Chair – Hilton Head Solid-State Sensors and Actuators Workshop 2020.*
  - *Tutorial Chair - IEEE Frequency Control Symposium 2019*.
  - *Group 1 TPC Chair - IEEE Frequency Control Symposium 2019*.
  - *Publicity Chair - IEEE Frequency Control Symposium 2018*.
  - *Tutorial Chair - IEEE Frequency Control Symposium 2017*.
  - *Organizer of the Focused Session entitled: "Near-Zero Power Sensors", IEEE Sensors 2017,* Glasgow, Scotland, UK, October 29 – November 1, 2017.
  - *Track Chair of the Track entitled: "TRACK 7-Acoustic and Ultrasound Sensors", IEEE Sensors 2017,* Glasgow, Scotland, UK, October 29 – November 1, 2017.
  - *Chair of the Session entitled: "MEMS/NEMS", IEEE International Midwest Symposium on Circuits and Systems 2017,* Boston, USA, August 6 – 9, 2017.
  - *Track Chair of the Track entitled: "TRACK 7-Acoustic and Ultrasound Sensors", IEEE Sensors 2016,* Orlando, Florida, October 30 – November 2, 2016.
  - *"NEMS/MEMS" Track Chair, 15th IEEE International Conference on Nanotechnology (IEEE NANO 2015)*, Rome, Italy, July 27-30, 2015.
  - *"N/MEMS: Sensors, Actuators, & Resonators" Topic Organizer, ASME 2015 International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK)*, San Francisco, USA, July 6-9 2015.

CONFERENCES

- **Technical Program Committee (TPC) membership:**
  - *Hilton Head Solid-State Sensors and Actuators Workshop 2020.*
  - *IEEE Transducers 2019.*

  - *IEEE International Conference on Micro Electro Mechanical Systems (MEMS) 2017-2019.*
  - *IEEE International Frequency Control Symposium (IEEE IFCS) 2014-2020.*
  - *European Frequency and Time Forum (EFTF) 2015-2020.*
  - *IEEE Sensors 2014-2017.*
  - *IEEE International Conference on Nanotechnology (IEEE NANO) 2015.*
  - *IEEE-AESS International Conference on Space and Satellite Telecommunications (ESTEL) 2012.*
- **Session Chair:**
  - *Routinely chair sessions at top IEEE conferences and workshops.*
  - *"Resonant Sensors", 2016 IEEE International Frequency Control Symposium (IFCS 2016)*, New Orleans, Louisiana, May 9-12 2016.
  - *"Acoustic Wave Chemicals Sensors" and "Force and Pressure Based Sensing Applications", IEEE Sensors 2015*, Busan, South Korea, November 3rd 2015.
  - *"Piezoelectric & SMA Energy Conversion Devices", Transducers 2015*, Anchorage, Alaska, June 25th 2015.
  - *"Acoustic Transducers" and "Magnetic Sensors", IEEE Sensors 2014*, Valencia, Spain, November 3rd 2014.
  - *"Thermoelectric Materials and Shape Memory Materials", 6th International Symposium on Functional Materials (ISFM 2014)*, Singapore, August 4-7 2014.
  - *"Physical Sensors", 2014 IEEE International Frequency Control Symposium (IFCS 2014)*, Taipei, Taiwan, May 19-22 2014.
- **Reviewer of:**
  - *IEEE International Conference on Nanotechnology (IEEE NANO) 2013*.
  - *IEEE International Symposium on Circuits and Systems (ISCAS) 2009-2010.*

EDITORIAL ACTIVITIES

- *Associate Editor of IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control.*
- *Associate Editor of IEEE Sensors Letters.*
- *"MEMS/NEMS" Section Editor for The Encyclopedia of Nanotechnology, Second Edition Springer (2014).*

PROPOSAL REVIEWER

- *NSF MRSEC IRG preliminary proposals, The Implementation Group (TIG), 2019.*
- *Technical Review Panel for the AME Programmatic funding initiative under the Advanced Manufacturing and Engineering (AME) at A*STAR in Singapore, 2018.*
- *NSF ECCS EPMD Unsolicited, Dr. Dimitris Pavlidis, 2014.*
- *NSF SBIR/STTR: Sensors and Instrumentation, Dr. Ben Schrag, 2014.*
- *NSF ECCS CCSS Unsolicited, Dr. Massood Tabib-Azar, 2013.*

JOURNAL REVIEWER

- *Nature Nanotechnology*

- *Nano Letters*
- *IEEE/ASME Journal of Microelectromechanical Systems (JMEMS)*
- *IEEE Transactions on Electron Devices*
- *IEEE Transactions on Ultrasonic Ferroelectrics and Frequency Control*
- *IEEE Electron Device Letters (EDL)*
- *Applied Physics Letters (APL)*
- *Nanotechnology*
- *Journal of Micromechanics and Microengineering (JMM)*
- *IEEE Sensors Journal*
- *Sensors & Actuators: A: Physical*
- *Sensors & Actuators: B: Chemical*
- *IEEE Antennas and Wireless Propagation Letters*
- *IEEE Journal of Selected Topics in Quantum Electronics*
- *IEEE Transactions on Magnetics*

UNIVERSITY SERVICE

- Member, Northeastern ECE - Graduate Affairs Committee 2018-2019.
- Member, Northeastern ECE - EE Curriculum Update Committee 2018-2019.
- Member, Northeastern ECE - Department Hiring Committee 2018-2019.
- Member, Northeastern ECE - Department Tenure&Promotion Committee 2017-2019.
- Member, Northeastern ECE - Department Chair Hiring Committee 2016-2017.
- Chair, Northeastern ECE - Distinguished Speaker Series Committee 2015-2017.
- Teaching Group Coordinator 2017/2018.
- PhD Qualifying Exam Coordinator 2016.
- Member, Northeastern ECE - Devices, Microelectronics, Optoelectronics, and Integrated Microsystems - Hiring Committee 2015-2016.
- Member, Northeastern ECE - Graduate Student Recruiting Committee 2014-2016.
- Member, Northeastern ECE - Resilient & Sustainable Energy Systems and Control of Cyber-Physical Systems - Hiring Committee 2014-2015.
- Member, Northeastern ECE Hiring Committee 2013-2015.
- Member, Northeastern ECE - Distinguished Speaker Series Committee 2012-2015.

PROFESSIONAL AFFILIATIONS

- *Institute of Electrical and Electronics Engineering (IEEE)*, Student Member 2008-2010, Member 2011-2017, Senior Member 2017-present
- *IEEE Ultrasonics, Ferroelectrics and Frequency Control Society (UFFC),* Student Member 2009-2010, Member 2011-present.
- *IEEE Electron Devices Society (EDS),* Student Member 2009-2010, Member 2011-present.
- *SPIE International Society for Optics and Photonics,* Member 2012-present.

ADDITIONAL INFORMATION

Nationality: *Italian,* Current US Immigration Status: *lawful permanent resident (green card).*