Muhammed S. Boybay

msboybay@uwaterloo.ca | Albany, NY
www.msboybay.com | +1 949 620 0730

EDUCATION

Doctor of Philosophy, Electrical and Computer Engineering
University of Waterloo, Waterloo, ON, Canada 2009
Thesis title: Sensitivity Enhancement of Near Field Probes Using Negative Materials
GPA 91/100

Bachelor of Science, Electrical and Electronics Engineering
Bilkent University, Ankara, Turkey 2004
GPA 3.81/4

RESEARCH INTERESTS

Applications of Artificial Matarials

- RF/Microwave circuit design for sensing systems
- Material characterization in RF/microwave bands
- MMIC and MCM technologies for RF/Microwave system development
- Evanescent fields and near field subwavelength sensing
- Design, fabrication and characterization of metamaterials and metasurfaces
- Applications of intelligent surfaces on radar and communication technologies

Microfluidics

- Electrical and microwave sensors for microfluidic and biosensing applications
- Micro-fabrication techniques for microfluidic chips and microwave components
- RF/Microwave circuit design for microfluidic applications

EXPERIENCE

State University of New York at Albany
Department of Cyber Security 2024 - Cont.
Visiting Researcher

- Expected to supervise graduate students and contribute to the cyber security challenges in wireless communication

University of Igdir, Igdir, Turkey
Department of Electrical-Electronics Engineering 2020 - Cont.
Department of Computer Science
Associate Professor

- Instructed graduate and undergraduate courses
- Department chair of Computer Science
- Department chair of Mechatronics Engineering (Graduate studies only)
- Member of the University Senate
- Established Microwave Sensors Research Lab

University of Waterloo, ON, Canada

Department of Mechanical and Mechatronics Engineering 2014 - 2017
Adjunct Assistant Professor

- Supervised graduate students.
- Led research activities that include developing metamaterial based mixers, sensors for temperature measurement and microwave circuitry for microfluidic platforms.

Antalya Bilim University, Antalya, Turkey

Department of Computer Engineering 2012 - 2016
Assistant Professor

- Member of Curriculum Development Committee for Computer Engineering and Electrical and Electronics Engineering
- Member of the Committee for Development of Graduate School Regulations
- Member of Strategic Planning Committee
- Chair of the Course and Exam Scheduling Commission
- Member of the Electrical and Electronics Engineering faculty hiring committee

Antalya Bilim University, Antalya, Turkey

College of Engineering 2013 - 2016
Associate Dean

- Organized and lead biweekly department chairs meetings
- Prepared application package for Master's Program in Electrical and Computer Engineering
- Supervised software development project for course and exam scheduling
- Represented Faculty of Engineering in the various commissions

University of Waterloo, ON, Canada

Department of Mechanical and Mechatronics Engineering 2010 - 2012
Postdoctoral Research Fellow

- Led and supervised projects for developing fabrication procedures for micro sensors integrated with microfluidic chips
- Developed localized microwave heaters for fast droplet manipulation in microfluidic devices and lab-on-a-chip applications
- Developed microwave sensors for droplet detection, classification and sorting applications in microfluidic devices
- Characterized microwave properties of Polydimethylsiloxane (PDMS)
- Wrote proposals for grant applications

University of Waterloo, ON, Canada

Department of Electrical and Computer Engineering 2009 - 2010
Postdoctoral Research Fellow

- Led and supervised projects for designing near field sensors based on metamaterial inclusions and negative materials
- Led and supervised projects for designing microwave circuits for phase detection used in near field sensors
- Conducted theoretical and numerical studies for open-ended coaxial line sensors with negative materials
- Analyzed electrically small resonators based on metamaterial unit cells for near field sensing applications

University of Waterloo, ON, Canada

Department of Electrical and Computer Engineering 2004 - 2009
Research Assistant

- Investigated mutual coupling reduction obtained by metamaterials between high profile antennas and analyzed matching, radiation efficiency and radiation pattern of such systems

- Employed metamaterials to increase gain of microstrip patch antennas
- Analyzed various near field probes for detecting cracks on Al surfaces using numerical tools
- Fabricated and tested electrically small loop detectors
- Designed numerical and experimental techniques for negative material characterization
- Designed and fabricated printed circuit boards for microwave applications
- Conducted theoretical research in the area of near field imaging and double negative metamaterials
- Designed artificial magnetic materials with negative effective permeability using periodic structures
- Designed and tested microwave near field sensors for crack detection on asphalt surfaces
- Developed finite difference time domain codes to simulate double negative metamaterials, evanescent field amplification and backward wave propagation
- Analyzed various waveguide and resonator structures using HFSS and COMSOL

PUBLICATIONS

Patent Applications

1. O.M. Ramahi and **M.S. Boybay**. "Sensitivity Enhancement of Near-Field Probes using Metamaterials", US Patent Application 2009/0309011 A1.
2. **M.S. Boybay** and O.M. Ramahi. "Metamaterial Particles for Near Field Sensing Applications", US Patent Application 2012/0086463 A1.
3. **M.S. Boybay**, C.L. Ren and O.M. Ramahi. "Microwave Heaters and Sensors for Microfluidic Systems and Lab-On-A-Chip", US Patent Application 61/566790.
4. C.L. Ren, G. Yesiloz and **M.S. Boybay**. "Microwave enabled portable, label-free, high-throughput detection and content sensing system for lab on a chip platforms", Canadian Patent Application CA 2963807 A1.

Book Chapters

1. **M.S. Boybay** and C. L. Ren, "Microwave in Microfluidics", Encyclopedia of Microfluidics and Nanofluidics, 2nd Edition, 2241-2250 Springer, New York, 2015.

SCI/SCIE Indexed Journal Papers

1. **M.S. Boybay**. "An analytical model of complementary split ring resonators for sensing applications" under preperation.
2. M. Alaftekin, **M.S. Boybay** and K. Cicek. "Analysis of metamaterial inspired sensors for extraction of multiple properties" under preperation.
3. **M.S. Boybay** and O.M. Ramahi. "Thin film characterization using negative material loaded open ended coaxial probes" under preperation.
4. K. Cicek, **M.S. Boybay**, R. Topkaya and AM Agarwal. "C-Band Operating Plasmonic Sensor with High Q-Factor Based on Silicon Nano-Ring", Applied Optics, 62(5), 1290-1295 (2023).
5. **M.S. Boybay**, K.Cicek. "Palladium Based Microwave Resonant Hydrogen Sensor", Advanced Theory and Simulations, 5(12), 2200396 (2022).
6. G. Yesiloz, **M.S. Boybay** and C.L. Ren. "Effective Thermo-Capillary Mixing in Droplet Microfluidics Integrated with a Microwave Heater", Analytical Chemistry, 89, 1978-1984, (2017).
7. D.Y. Wong, G. Yesiloz, **M.S. Boybay** and C.L. Ren. "Microwave Temperature Measurement in Microfluidic Devices", Lab on a Chip, 16, 2192-2197 (2016).

8. **M.S. Boybay**. "Behavior of metamaterial based microwave components for sensing and heating of nanoliter scale volumes", Turkish Journal of Electrical Engineering & Computer Sciences, 25, 3503 – 3512 (2016).
9. G. Yesiloz, **M.S. Boybay** and C. Ren. "Label-Free High-Throughput Detection and Content Sensing of Individual Droplets in Microfluidic Systems", Lab on a Chip, 15, 4008 - 4019 (2015) - **featured as cover article**.
10. B. Hu, Z. Ren, **M.S. Boybay** and O.M. Ramahi. "Waveguide Probe Loaded With Split-Ring Resonators for Crack Detection in Metallic Surfaces", IEEE Transactions on Microwave Theory and Techniques, 62, 871 - 878 (2014).
11. **M.S. Boybay**, A. Jiao, T. Glawdel and C.L. Ren. "Microwave Sensing and Heating of Individual Droplets in Microfluidic Devices", Lab on a Chip, 13, 3840 - 3846 (2013) - **featured as cover article**.
12. **M.S. Boybay** and O.M. Ramahi. "Non-Destructive Thickness Measurement Using Quasi-Static Resonators", IEEE Microwave and Wireless Components Letters, 23, 217 - 219 (2013).
13. O.M. Ramahi, T. Almoneef, M. Alshareef and **M.S. Boybay**. "Metamaterial Particles for Electromagnetic Energy Harvesting", Applied Physics Letters, 101, 173903 (2012).
14. A. M. Albishi, **M.S. Boybay** and O.M. Ramahi. "Complementary Split-Ring Resonator for Crack Detection in Metallic Surfaces", IEEE Microwave and Wireless Components Letters, 22, 330 - 332 (2012).
15. **M.S. Boybay** and O.M. Ramahi. "Material Characterization using Complementary Split-Ring Resonators", IEEE Transactions on Instrumentation and Measurement, 61, 3039 - 3046 (2012).
16. Z. Ren, **M.S. Boybay** and O.M. Ramahi. "Near-field Subsurface Detection using Metamaterial Inspired Probes", Applied Physics A, 103, 839 - 842 (2011).
17. **M.S. Boybay** and O.M. Ramahi. "Open Ended Coaxial Line Probes with Negative Permittivity Materials", IEEE Transactions on Antennas and Propagation, 59, 1765 - 1769 (2011).
18. L. Yousefi, **M.S. Boybay** and O.M. Ramahi. "Characterization of Metamaterials Using a Strip Line Fixture", IEEE Transactions on Antennas and Propagation, 59, 1245 - 1253 (2011).
19. Z. Ren, **M.S. Boybay** and O.M. Ramahi. "Near-Field Probes for Subsurface Detection Using Split-Ring Resonators", IEEE Transactions on Microwave Theory and Techniques, 59, 488 - 495 (2011).
20. M.M. Bait Suwailam, **M.S. Boybay**, and O.M. Ramahi. "Electromagnetic Coupling Reduction in High-Profile Monopole Antennas Using Single-Negative Magnetic Metamaterials for MIMO Applications", IEEE Transactions on Antennas and Propagation, 58, 2894 - 2902 (2010).
21. H. Attia, L. Yousefi, M.M. Bait-Suwailam, **M.S. Boybay** and O.M. Ramahi. "Enhanced-Gain Microstrip Antenna Using Engineered Magnetic Superstrates", IEEE Antennas and Wireless Propagation Letters, 8, 1198 - 1201 (2009).
22. **M.S. Boybay** and O.M. Ramahi. "Experimental and Numerical Study of Sensitivity Improvement in Near Field Probes using Single Negative Media", IEEE Transactions on Microwave Theory and Techniques, 57, 3427 - 3433 (2009).
23. **M.S. Boybay** and O.M. Ramahi. "Waveguide Probes using Single Negative Media", IEEE Microwave and Wireless Components Letters, 19, 641 - 643 (2009).
24. **M.S. Boybay** and O.M. Ramahi. "Near-field probes using double and single negative media", Physical Review E, 79, 016602 (2009).

Other Journal Papers

1. S.Zuhur and **M.S. Boybay**. "Design of Wideband Rf Energy Harvesting Circuit with Lumped Elements Working Efficiently in 1.5 GHz – 3.1 GHz Band". Journal of the Institute of Science and Technology (Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi), 13(2), 973-982 (2023).

Conference Papers

1. **M.S. Boybay**, M. Alaftekin, K. Cicek. "Analysis of Electrically Small Resonators for Multiple Feature Detection", IEEE Antennas and Propagation Society International Symposium (AP-S 2024), Florence, Italy, July 2024 pp. 1685 - 1686.
2. **M.S. Boybay**, K. Cicek, M. Alaftekin. "Modified CSRR Sensor for Magnetodielectric Material Characterization", IEEE Antennas and Propagation Society International Symposium (AP-S 2024), Florence, Italy, July 2024 pp. 1689 - 1690.
3. K. Cicek, **M.S. Boybay**, E. Alucluer. "Palladium Hydrogen Detection via Vernier–Based Archimedean Spirals", IEEE Antennas and Propagation Society International Symposium (AP-S 2024), Florence, Italy, July 2024 pp. 341 - 342.
4. S. Zuhur, **M.S. Boybay**. "An Ultrawideband Rectifier Circuit Design for sub-6 GHz in 5G RF Energy Harvesting Applications", IEEE Antennas and Propagation Society International Symposium (AP-S 2024), Florence, Italy, July 2024 pp. 1785 - 1786.
5. **M.S. Boybay**, S. Zuhur. "Analysis of an Electromagnetic Energy Harvester for Different Incident Wave Polarization and Loads" 3rd International Conference on Applied Engineering and Natural Sciences, Konya, Turkey, July 2022, pp. 747 - 750.
6. **M.S. Boybay**."Electrically Small Resonator Design for Characterization of Magnetodielectric Materials" 2021 8th International Conference on Electrical and Electronics Engineering (ICEEE), Antalya, Turkey, April 2021, pp. 197 - 201.
7. **M.S. Boybay**."A Novel Beam Steering Method Using Dispersive Superstrates with Low Dielectric Constant" 2nd International Symposium on Applied Sciences and Engineering (ISASE2021), Erzurum, Turkey, April 2021, pp. 297 - 300.
8. A. Kurt, **M.S. Boybay**. "A Novel Low Cost Beam Stearing Method Using Dispersive Superstrate" IEEE Antennas and Propagation Society International Symposium (AP-S 2018), Boston, Massachusetts, July 2018, pp. 2547 - 2548.
9. A. Musul, H.O. Yilmaz, **M.S. Boybay**. "Sensing in Inhomogeneous Media Using Metamaterial Inspired Sensors", Accepted for publication in 10th International Congress on Advanced Electromagnetic Materials in Microwaves and Optics – Metamaterials 2016, Crete, Greece, September 2016.
10. H.O. Yilmaz, **M.S. Boybay**. "Sensing in Anisotropic and Lossy Media using Complementary Split Ring Resonators", IEEE Antennas and Propagation Society International Symposium (AP-S 2016), Fajardo, Puerto Rico, June 2016, pp. 499 - 500.
11. **M.S. Boybay**. "An Analytical Method for Metamaterial Unit Cells in Multilayered Media", IEEE Antennas and Propagation Society International Symposium (AP-S 2016), Fajardo, Puerto Rico, June 2016, pp. 497 - 498.
12. G. Yesiloz, **M.S. Boybay**, and C.L. Ren. "A Microwave Based Microfluidic Mixer", Gordon Research Conference on the Physics & Chemistry of Microfluidics, West Dover, VT, USA, June 2015.
13. A. Ali, O.M. Ramahi and **M.S. Boybay**. "Measurement of Paint and Coating Thickness on Metallic Plates Using Smart Near Field Microwave Sensor", IEEE Antennas and Propagation Society International Symposium (AP-S 2014), Memphis, TN, July 2014, pp. 916 - 917.
14. H. Attia, **M.S. Boybay**. "Patch Antennas with Superstrates for Landmine Detection", IEEE Antennas and Propagation Society International Symposium (AP-S 2014), Memphis, TN, July 2014, pp. 1837 - 1838.
15. G. Yesiloz, **M.S. Boybay**, C. Ren. "High-Throughput Microwave Sensing of Individual Droplets for Microfluidic Systems", 12th International Conference on Nanochannels, Microchannels, and Minichannels (ICNMM2014), Chicago IL, August 2014, (technical presentation only).
16. **M.S. Boybay**, A. Jiao, T. Glawdel and C.L. Ren. "Microwave Sensing and Heating of Individual Droplets", Gordon Research Conference on the Physics & Chemistry of Microfluidics, Lucca, Italy, June 2013.

17. A. M. Albishi, **M.S. Boybay** and O.M. Ramahi. "Complementary split-ring resonator as a high sensitivity sensor", IEEE Antennas and Propagation Society International Symposium (AP-S 2012), Chicago, IL, July 2012, pp. 1 - 2.
18. O.M. Ramahi, Z. Ren, and **M.S. Boybay** "Near-field probes using metamaterial inclusions for enhanced sensitivity," IEEE Sensors 2010, Waikoloa, HI, USA, November, 2010, pp. 1681 - 1684 (Invited Paper).
19. **M.S. Boybay**, S. Kim and O.M. Ramahi. "Negative Material Characterization Using Microstrip Line Structures", IEEE Antennas and Propagation Society International Symposium (AP-S 2010), Toronto ON, July 2010, pp. 1 - 4.
20. Z. Ren, **M.S. Boybay** and O.M. Ramahi. "Metamaterial Inspired Probe for Noninvasive near-Field Subsurface Sensing", IEEE Antennas and Propagation Society International Symposium (AP-S 2010), Toronto ON, July 2010, pp. 1 - 4.
21. N. Suwan, **M.S. Boybay** and O.M. Ramahi. "ENG-Sensor: Enhanced Open-Ended Coaxial Line Sensor for Material Characterization Application", IEEE Antennas and Propagation Society International Symposium (AP-S 2010), Toronto ON, July 2010, pp. 1 - 4.
22. L. Yousefi, **M.S. Boybay** and O.M. Ramahi. "Experimental Retrieval of the Effective Parameters of Metamaterials Using a Strip Line Method", IEEE Antennas and Propagation Society International Symposium (AP-S 2010), Toronto ON, July 2010, pp. 1 - 4.
23. O.M Ramahi, **M.S. Boybay**, O. Siddiqui, L. Yousefi, A. Kabiri, H. Attia, M.M. Bait Suwailam and Z. Ren. "Metamaterials: An Enabling Technology for Wireless Communications", STS International Conference on Communication Technologies (ICCT 2010), Riyadh, SA, January 2010 (Keynote Speech).
24. O.M. Ramahi, **M.S. Boybay** and Z. Ren, "Near-Field Probes using Metamaterial Particles", 44th Annual Symposium of the International Microwave Power Institute, Denver, Colorado, USA, July 14 - 16, 2010 (Invited Paper).
25. Z. Ren, **M.S. Boybay** and O.M. Ramahi. "Near-field Subsurface Detection using Metamaterial Inspired Probes", NATO Advanced Research Workshop: Metamaterials for Secure Information and Communication Technologies (META'10), Cairo, Egypt, February 2010, pp. 367 - 370.
26. **M.S. Boybay** and O.M. Ramahi. "Experimental Verification of Sensitivity Improvement in Near Field Probes using Single Negative Metamaterials", International Microwave Symposium (IMS 2009), Boston MA, June 2009, pp. 1677 - 1680.
27. **M.S. Boybay** and O.M. Ramahi. "Improved Sensitivity in Coaxial Line Probes Using Materials with Negative Permittivity", IEEE Antennas and Propagation Society International Symposium (AP-S 2009), Charleston, SC, June 2009, pp. 1 - 4.
28. Z. Ren, **M.S. Boybay** and O.M. Ramahi. "Near-field Subsurface detection in lossy media using Single Split Resonator Probe", IEEE MTT-S International Microwave Workshop on Wireless Sensing, Local Positioning, and RFID (IMWS 2009), Cavtat Croatia, September 2009, pp. 1 - 3.
29. M.M. Bait Suwailam, **M.S. Boybay**, and O.M. Ramahi. "Mutual Coupling Reduction in MIMO antennas Using Artificial Magnetic Materials", 13th International Symposium on Antenna Technology and Applied Electromagnetics (ANTEM 2009), Banff AB, February 2009, pp. 1 - 4.
30. M.M. Bait Suwailam, **M.S. Boybay**, and O.M. Ramahi. "Electromagnetic Coupling Reduction in High-Profile Antennas Using Single-Negative Metamaterials for MIMO applications", International Conference on Communication, Computer and Power (ICCCP 2009), Muscat Oman, February 2009, pp. 115 - 120.
31. M.M. Bait Suwailam, **M.S. Boybay**, and O.M. Ramahi. "Single-Negative (SNG) Metamaterials for Mutual Coupling Reduction in High-Profile Antennas", IEEE Antennas and Propagation Society International Symposium (AP-S 2009), Charleston, SC, June 2009, pp. 1 - 4.

32. **M.S. Boybay** and O.M Ramahi. "Waveguide resonators for verification of enhancing evanescent field detection using metamaterials", IEEE Antennas and Propagation Society International Symposium (AP-S 2008), San Diego, CA, July 2008, pp. 1 - 4.
33. **M.S. Boybay** and O.M Ramahi. "Near-field probes using double and single negative media", NATO Advanced Research Workshop: Metamaterials for Secure Information and Communication Technologies (META'08), Marrakesh, Morocco, May 2008, pp. 725 - 731.
34. **M.S. Boybay** and O.M. Ramahi. "Double Negative Metamaterials for Subsurface Detection", 29th Annual International Conference of the IEEE EMBS, Lyon, France, August 2007, pp. 3485 - 3488.
35. **M.S. Boybay** and O.M Ramahi. "Evanescent field detection using negative refractive index lenses", IEEE Antennas and Propagation Society International Symposium (AP-S 2007), Honolulu, HI, June 2007, pp. 5507 - 5510.
36. M. Yavuz, **M.S. Boybay**, C. Elbuken, M.J. Andrews, C.R. Hu and J.H. Ross. "Bi-Sr-Ca-Cu-O Superconducting Thin Films: Theory and Experiment", European Conference on Applied Superconductivity (EUCAS'05), Vienna, Austria, Journal of Physics: Conference Series 43, July 2006, pp. 277 - 280.

TEACHING EXPERIENCE

University of Igdir, Igdir, Turkey
Department of Electrical and Electronics Engineering 2020-2024
Associate Professor
- Computer Networks
- Digital Communications
- Senior Project
- Metamaterials
- Scientific Research Techniques and Ethics
- Control Systems
- Signals and Systems
- Communication Systems
- Antennas and Propagation
- Introduction to Microfluidic Systems
- Antenna Engineering
- Design in Electrical and Electronics Engineering

University of Turkish Aeronautical Association, Ankara, Turkey
Department of Electrical and Electronics Engineering 2020
Instructor
- EEE 304 - Communication Systems I
- EEE 462 - Communication Systems II

Istanbul Rumeli University, Istanbul, Turkey
Department of Computer Engineering 2020
Instructor
- BLM 304 - Computer Networks
- BLM 310 - Web Programming

Antalya Bilim University, Antalya, Turkey
Department of Electrical and Electronics Engineering 2012-2016
Assistant Professor
- PHYS 101 - Physics I
- EE 212 - Electromagnetic Field Theory II
- ECE 522 - RF Design, Microwave Engineering and Metamaterials

- EE 412 - Antennas and Propagation
- ECE 523 - Antenna Engineering
- ISG 514 - Radiation Safety

University of Waterloo, ON, Canada

Department of Electrical and Computer Engineering 2004-2009
Teaching Assistant
(responsibilities included preparing and conducting tutorial sessions, supervising lab sessions, grading exams, lab reports and assignments preparing demos based on numerical simulations for lectures)

- ECE 370 - Electromagnetic Fields (Winter 2009 and Spring 2007)
- ME 230 - Control of Properties of Materials (Fall 2005)
- MTE 111 - Structure and Properties of Materials (Spring 2005)

Bilkent University, Ankara, Turkey

Department of Electrical and Electronics Engineering 2003-2004
Undergraduate Teaching Assistant

- Supervised lab sessions for Analog Electronics (EEE 211) for two terms. The lab sessions were 8 hours a week and were dedicated to fabrication of a radio transceiver working at 30 Mhz
- Conducted weekly tutorial sessions for General Physics (PHYS 102). Topics included electrostatic, magnetostatic and Maxwell's equations.

GRANTS

Agency: The Scientific and Technical Research Council of Turkey (ARDEB 1002)
Contribution: Researcher 2024
Grant Amount: 75K TRY
Proposal Title: Single Source Switched-Capacitor Multilevel Inverter Application for Electric Vehicles

Agency: The Scientific and Technical Research Council of Turkey (ARDEB 1001)
Contribution: **Principle Investigator** 2022
Grant Amount: 1.1M TRY
Proposal Title: Modelling and development of microwave sensors for characterization of both electrical and magnetic properties of materials

Agency: The Scientific and Technical Research Council of Turkey (ARDEB 1001)
Contribution: Researcher 2015
Grant Amount: 270K TRY
Proposal Title: Novel approaches for improving the accuracy of reflection-transmission measurement techniques at microwave frequencies

Agency: The Scientific and Technical Research Council of Turkey (ARDEB 1001)
Contribution: **Principle Investigator** 2013
Grant Amount: 282K TRY
Proposal Title: Development of cheap and highly sensitive microwave near field sensors for non-destructive evaluation of carbon fiber reinforced plastics and their coatings

Agency: MITACS (Canada)
Contribution: **Principle Investigator** 2011
Grant Amount: 55K CAD
Proposal Title: Integration of Microwave Technology to Microfluidic Systems for High Throughput Combinatorial Tests and Lab-On-A-Chip Applications

SUPERVISORY EXPERIENCE

Graduate Students

- Sevket KOKSAL
  MS Student 2023-
  Mechatronics Engineering, University of Igdir
  Thesis Title: RCS reduction on curved surfaces by using metasurfaces.
- Melek ALAFTEKIN
  PhD Student 2022-
  Mechatronics Engineering, University of Igdir
  Thesis Title: Machine Learning for Resonator Based Microwave Material Characterization Methods.
- Gulderen GOCER
  MS Student 2021-2023
  Mechatronics Engineering, University of Igdir
  Thesis Title: Tonnage measurement of the moving vehicle.
- Hasan Onder Yilmaz
  MS Student 2015-2016
  Electrical and Computer Engineering, Antalya Bilim University
  Thesis Title: Metamaterial sensors for anisotropic, lossy media.
- Aysegul Musul
  MS Student 2014-2016
  Electrical and Computer Engineering, Antalya Bilim University
  Thesis Title: Microwave characterization of carbon fiber reinforced plastics.
- Gurkan Yesiloz
  PhD student 2013-2017
  Mechanical and Mechatronics Engineering, University of Waterloo
  Thesis Title: Development of Microwave/Droplet-Microfluidics Integrated Heating and Sensing Platforms for Biomedical and Pharmaceutical Lab-on-a-Chip Applications.
- Ali Albishi
  MS Student 2010-2011
  Electrical and Computer Engineering, University of Waterloo
  Thesis Title: Detection of Sub-Millimeter Surface Cracks using Complementary Split-Ring Resonator.
- Zhao Ren
  PhD Student 2008-2011
  Electrical and Computer Engineering, University of Waterloo
  Thesis Title: Microwave near-field probes using single negative meta-materials for subsurface detection.
- Nael Suwan
  MS Student 2009-2011
  Electrical and Computer Engineering, University of Waterloo
  Thesis Title: Investigation of RF direct detection architecture circuits for metamaterial sensor applications.

Co-op Students

- Mehta Ronak Mayur 2012
  Electrical Engineering, Indian Institute of Technology Bombay
  Research Topic: Design and fabrication of microwave circuits for microfluidic applications.

- Austin Jiao 2011
  Nanotechnology Engineering, University of Waterloo
  Research Topic: Temperature measurements in microfluidic systems using fluorescent dyes.
  Developing experimental procedures for fabrication of microfluidic systems.
- Seunghwan Kevin Kim 2008
  Electrical and Computer Engineering, University of Waterloo
  Research Topic: Fabrication of characterization structures for meta-materials.
- Mohamed El-Beheiry 2007
  Electrical and Computer Engineering, University of Waterloo
  Research Topic: Design and fabrication of microwave near-field probes with subwavelength resolution.

AWARDS AND HONORS

Institution: MITACS Canada 2011-2012
MITACS Elevate Strategic Fellowship

Institution: University of Waterloo, ON, Canada 2004-2009
University of Waterloo Graduate Scholarships for 5 terms
International Doctoral Student Awards for 13 terms
International Masters Student Awards for 2 terms

Institution: Bilkent University, Ankara, Turkey 2000-2004
Full scholarship covering tuition, accommodation and stipend
High Honor student for 7 terms
Honor student for one term

Institution: Student Selection and Placement Centre (ÖSYM), Turkey 2000
Ranked as the 325. among 1.5 million students in nationwide University Entrance Exam.

Institution: The Scientific and Technical Research Council of Turkey 1999
Bronze Medal in the 7th National Physics Olympiads

PRESENTATION AND TALKS

"Analysis of Electrically Small Resonators for Multiple Feature Detection" July 2024
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2024)
Florence, Italy

"Modified CSRR Sensor for Magnetodielectric Material Characterization" July 2024
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2024)
Florence, Italy

"An Ultrawideband Rectifier Circuit Design for sub-6 GHz in 5G RF Energy Harvesting Applications" July 2024
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2024)
Florence, Italy

"Palladium Hydrogen Detection via Vernier–Based Archimedean Spirals" July 2024
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2024)
Florence, Italy

"Microwave Engineering and New Approaches in Sensor Design Using Metamaterials" April 2024
Invited Lecture
Erasmus+ Staff Mobility For Teaching
Kozani, Greece

"Computer Networks" April 2024
Invited Lecture
Erasmus+ Staff Mobility For Teaching
Kozani, Greece

"A systematic approach to methodology" February 2024
Invited Talk & Educator
Workshop on Grant Applications
Igdir, Turkey

"Electrically Small Resonator Design for Characterization of Magnetodielectric Materials" April 2021
Oral Presentation
2021 8th International Conference on Electrical and Electronics Engineering (ICEEE)
Antalya, Turkey

"A Novel Beam Steering Method Using Dispersive Superstrates with Low Dielectric Constant" April 2021
Oral Presentation
2nd International Symposium on Applied Sciences and Engineering (ISASE2021)
Erzurum, Turkey

"Sensing in Anisotropic and Lossy Media using Complementary Split Ring Resonators" June 2016
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2016)
Fajardo, Puerto Rico

"An Analytical Method for Metamaterial Unit Cells in Multilayered Media" June 2016
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2016)
Fajardo, Puerto Rico

"Microwave Sensing and Heating of Individual Droplets" June 2013
Poster Presentation
Gordon Research Conference on the Physics & Chemistry of Microfluidics
Lucca, Italy

"Microwave Technologies for Microfluidic Platforms" November 2011
Invited Talk
Patheon Inc.
Mississauga, ON, Canada

"Microwave Technology for Microfluidic Systems" March 2011
Oral Presentation
Waterloo-DRDC (Defence Research and Development Canada) Workshop
Waterloo ON, Canada

"Negative Materials and Their Applications in Near Field Sensors" January 2011
Invited Talk
TOBB University of Economics and Technology
Ankara Turkey

"Microfluidic Platforms for Lab-on-a-Chip and Pharmaceutical Applications" November 2010
Poster Presentation
Canada Research Chairs: Thinking Ahead for a Strong Future
Toronto ON, Canada

"Negative Material Characterization Using Microstrip Line Structures" July 2010
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2010)
Toronto ON, Canada

"Metamaterial Inspired Probe for Noninvasive near-Field Subsurface Sensing" July 2010
Oral Presentation
IEEE Antennas and Propagation Society International Symposium (AP-S 2010)
Toronto ON, Canada

"Sensitivity Enhancement of Near Field Probes Using Negative Materials" July 2009
PhD Defense
University of Waterloo
Waterloo ON, Canada

"Evanescent Field Probes with Negative Materials" June 2009
PhD Seminar
University of Waterloo
Waterloo ON, Canada

"Metamaterial Enhanced Evanescent Field Characterization for Subsurface Detection" April 2007
PhD Proposal Defense
University of Waterloo
Waterloo ON, Canada

"Magnetic nano-structures for nanoelectronics, 'Vortex Engineering'" June 2005
Poster Presentation
Emerging Materials Knowledge Conference
Toronto ON, Canada

PROFESSIONAL ACTIVITIES

- Reviewed proposals for The Scientific and Technical Research Council of Turkey (TUBITAK)
- Member of IEEE Microwave Theory and Techniques Society
- Member of IEEE Antennas and Propagation Society

- Member of Mitacs College of Reviewers
- Reviewed papers for:
  - IEEE Transactions on Microwave Theory and Techniques
  - IEEE Microwave and Wireless Components Letters
  - IEEE Antennas and Wireless Propagation Letters
  - IEEE Transactions on Instrumentation and Measurement
  - IEEE Access
  - Sensors and Actuators A: Physical
  - Progress in Electromagnetics Research
  - International Journal of Electronics and Communications
  - Journal of Applied Physics
  - Sensors
  - Materials
  - Electronics
  - International Journal of RF and Microwave Computer-Aided Engineering
  - Chemsensors
  - Nanomaterials
- Technical Committee Member of
  - 22nd Signal Processing and Communications Applications Conference
  - 2021 8th International Conference on Electrical and Electronics Engineering (ICEEE)

OTHER ACTIVITIES

Organized "Networking Event in Applications of Micro/Nano Technologies" March 2012
Mississauga, ON, Canada

Attended "Project Management Workshop, A Team Approach" Fall 2011
London, ON, Canada

Received "Certificate of Completion, Teaching Development Program" Fall 2011
Centre for Teaching Excellence, University of Waterloo
Waterloo, ON, Canada

Attended "Networking Workshop" Spring 2011 & Fall 2011
Toronto, ON, Canada

SKILLS SUMMARY

Electromagnetics and Microwave Engineering

- Simulation Tools: HFSS, FDTD Techniques, CST, COMSOL
- Experimentation: Network analyzers, oscilloscopes, signal generators, SMA connectors, N-type connectors
- Measuring antenna parameters, including scattering parameters and radiation patterns

- Gerber file generation for printed circuit board manufacturing
- Circuit Design Tools: Momentum, ADS and CADENCE
- Strong background in electromagnetics and physics

Microfluidics and Microfabrication
- Soft lithography technique for microfluidic chip fabrication
- Using magnetron sputtering for electrical sensor designs
- General experience in microfabrication and analysis tools such as optical profilometers, optical lithography techniques, fluorescent microscopy, etc.

Computer
- Programming: MATLAB, JAVA and LabView
- Latex and Microsoft Office Tools

General
- Excellent problem solving and analytical skills
- Independent and self motivated worker who enjoys sharing knowledge and having discussions in a group environment

LANGUAGES

Fluent in English and Turkish

REFERENCES

Professor Omar RAMAHI
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Forschungsstrasse 111 5232 Villigen PSI Switzerland
(Also with Antalya Bilim University)
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