

RESEARCH INTERESTS

- **Photonics:** Optical cloaking, Optical waveguides
- **Optoelectronics:** Photoconductive antennas, Photomixers
- **Plasmonics:** Plasmonic cloaking, Plasmonic waveguides
- **Graphene:** Transistors, Waveguides
- **Quantum Optics:** Single photon sources

EDUCATION

- Ph.D. Student** (Single Organic Molecules in Integrated Optical Cavities and Waveguides for Quantum Technologies);
University of Naples Federico II, Naples, Italy (ASS/INO/o24/2020/FI, ASS/INO/o18/2022/FI) **Since 2020**
• *Supervisor: Costanza Toninelli*
- Ph.D. in Electrical Engineering (Field and waves); Isfahan University of Technology (IUT), Isfahan, Iran 2014-2019
• *Analysis and Modeling of Graphene-Based Photoconductive Antennas*
- M.Sc. in Electrical Engineering (Field and waves); Isfahan University of Technology (IUT), Isfahan, Iran 2012-2014
• *Study, Analysis and Simulation of Pulsed and Continuous-Wave THz Photoconductive Antennas*
- B.Sc. in Electrical Engineering (Electronics); Jundi Shapour University of Technology (JSU); Dezful, Iran 2008-2012
• *Study of Intelligent Networks in Communication Networks*

RESEARCH EXPERIENCE

- Collaboration Research Project** **InGaAs-Based Photomixers Coupled to Multi-polar Antennas**
• **Since 2019** Southern Institute of Electronics, University of Montpellier, France, Prof. Luca Varani and Prof. Stephane Blin

PUBLICATIONS

- Journal Articles** **Since 2016**
- **2022-R.** Duquennoy, M. Colautti, **R. Emadi**, and et al., "Real-Time Two-Photon Interference from Distinct Molecules on the Same Chip," *Optica*, vol. 9, no. 7, p.p. 731-737, Jul. 2022
 - **2021-E.** Moreno, J. P. Gonzalez, **R. Emadi**, and et al., "BCC-Grid Versus SC-Grid in the Modeling of a Sheet of Graphene as a Surface Boundary Condition in the Context of ADE-FDTD," *Mathematics and Computers in Simulation*, vol. 186, pp. 52-61, Aug. 2021
 - **2020-E.** Moreno, J. B. Roldan, **R. Emadi**, and et al., "Numerical Study Of Graphene Heat Spreaders For A THz Quantum Diode Based On A G-MGIM Junction," *International Journal of Thermophysics*, vol. 41, no. 89, pp. 1-25, Apr. 2020
 - **2019-R.** **Emadi**, and et al., "Ultra-Deep Sub-Wavelength Mode Confinement in Nano-Scale Graphene Resonator-Coupled Waveguides," *Applied Optics*, vol. 58, no. 26, pp. 7241-7250, Sep. 2019
 - **2019-R.** **Emadi**, and et al., "Limiting Factors for Optical Switching Using Nano-Structured Graphene-Based Field Effect Transistors," *Applied Optics*, vol. 58, no. 3, pp. 571-578, Jan. 2019
 - **2019-R.** **Emadi**, and et al., "Numerical Investigation of Saturation Behaviors in Photoconductive Antennas under High Bias Conditions," *Opt. Eng.*, vol. 58, no 2, p. 027112, Feb. 2019
 - **2018-R.** **Emadi**, and et al., "Theoretical Investigation of Dynamic Switching Functionality in Graphene-Based Waveguides," *IEEE Photonics Technology Letters*, vol. 30, no. 15, pp. 1353-1356, Aug. 2018
 - **2018-R.** **Emadi**, and et al., "Numerical Investigation of Slow Light Propagation in Graphene-Based Waveguides," *IEEE Transactions on Electromagnetic Compatibility*, vol. 60, no. 6, pp. 1857-1864, Dec. 2018
 - **2018-R.** **Emadi**, and et al., "Plasmonic Cloaking for Irregular Inclusions Using an Epsilon-Near-Zero Region Comprised of Graphene-Silica Stack," *Journal of Optical Society of America B (JOSAB)*, vol. 35, no. 2, pp. 643-651, Mar. 2018
 - **2018-R.** **Emadi**, and et al., "Use of an Epsilon-Near-Zero Region Comprised of a Graphene Strip-Silica Stack for Designing Cloaking and Reflection Devices," *IEEE Sensors Journal*, vol. 18, no. 5, pp. 1887-1894, Mar. 2018
 - **2018-R.** **Emadi**, and et al., "Transmitting and Detecting THz Pulses Using Graphene and Metals Based Photoconductive Antennas," *accepted for Journal of Optical Society of America B (JOSAB)*, vol. 35, no. 1, pp. 113-121, Jan. 2018
 - **2017-R.** **Emadi**, and et al., "Investigation of Saturation Phenomena in Spatially Dispersive Graphene-Based Photoconductive Antennas Using Hot-Carriers Effects," *IEEE Journal of Quantum Electronics*, vol. 53, no. 5, pp. 1-8, Oct. 2017
 - **2017-R.** **Emadi**, and et al., "Analysis and Design of Photoconductive Antenna Using Spatially Dispersive Graphene Strips with Parallel-Plate Configuration," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 24, no. 2, pp. 1-9, Mar.-Apr. 2018
 - **2017-R.** **Emadi**, and et al., "Analysis and Design of Graphene-based Surface Plasmon Waveguide Switch at Long-Wavelength Infrared Frequencies," *in IEEE Journal of Selected Topics in Quantum Electronics*, vol. 23, no. 5, pp. 1-9, Sep.-Oct. 2017
 - **2017-R.** **Emadi**, and et al., "Theoretical Modeling of Terahertz Pulsed Photoconductive Antennas Based on Hot-Carriers Effect," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 23, no. 4, pp. 1-9, July-Aug 2017
 - **2016-R.** **Emadi**, and et al., "Hybrid Computational Simulation and Study of Terahertz Pulsed Photoconductive Antennas," *J. Infrared, Millimeter, Terahertz Waves*, vol. 37, no. 11, pp. 1069-1085, Nov. 2016

PUBLICATIONS

Conference Proceedings

Since 2014

- **2019-R. Emadi**, and et al., "Ultra-Deep Sub-Wavelength Mode Confinement in Graphene Waveguides," *2019 USNC-URSI Radio Science Meeting (Joint with AP-S Symposium)*, Atlanta, GA, USA, 2019, pp. 131-132
- **2018-R. Emadi**, and et al., "Robust Multi-Layer Graphene-Based Plasmonic Cloaking," *2018 USNC-URSI Radio Science Meeting (Joint with AP-S Symposium)*, Boston, MA, USA, 2018, pp. 145-146
- **2018-R. Emadi**, and et al., "Characterization of Graphene-Based Waveguide Capacitance for Switching Applications," *2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, USA, 2018, pp. 147-148
- **2017-R. Emadi**, and et al., "Design of Photoconductive Antenna Using Spatially Dispersive Graphene Strips," *2017 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, San Diego, CA, USA, 2017, pp. 2585-2586
- **2016-R. Emadi**, and et al., "Design of low loss waveguide switch using graphene strips at THz frequencies," *2016 Fourth International Conference on Millimeter-Wave and Terahertz Technologies (MMWaTT)*, Tehran, Iran, 2016, pp. 95-98
- **2016-M. Karimi, R. Emadi**, and et al., "Analysis and improvement of photo-thermoelectric current in waveguide-fed Graphene FETs," *2016 Fourth International Conference on Millimeter-Wave and Terahertz Technologies (MMWaTT)*, Tehran, Iran, 2016, pp. 1-4
- **2015-R. Emadi**, and et al., "Hybrid analysis of terahertz photoconductive antennas using energy balance transport model" *2015 40th International Conference on Infrared, Millimeter, and Terahertz waves (IRMMW-THz)*, Hong Kong, 2015, pp. 1-2
- **2014-N. Barani, R. Emadi**, and et al., "Accurate calculation of excited photocurrent in terahertz photoconductive antennas by using energy balance transport model," *2014 Third International Conference on Millimeter-Wave and Terahertz Technologies (MMWaTT)*, Tehran, Iran, 2016, pp. 1-4

EDITOR EXPERIENCE

Optics (Science Publishing Group)

2018

- Lead Guest Editor

REVIEWER EXPERIENCE

- **IEEE-Since 2017:** IEEE Transactions on Industrial Electronics, IEEE Transactions on Nanotechnology, IEEE Transactions on Terahertz Science and Technology, IEEE Journal of Solid State Circuits, IEEE Sensors Journal
- **AIP-Since 2020:** APL, Applied Physics Letters
- **IOP-Since 2018:** Nanotechnology, Journal of Engineering Research Express
- **Springer-Since 2016:** Journal of Infrared, Millimeter, and Terahertz Waves
- **OSA-Since 2017:** Optics Letters, Optics Express, Applied Optics, Journal of Optical Society of America B
- **SPIE-Since 2016:** Journal of Nanophotonics, Optical Engineering
- **Zhongguo Kexue Zazhishe-Science in China Press-Since 2018:** Chinese Optics Letters

TEACHING AND MENTORING EXPERIENCE

Graduate Students

2014-2019

- Teaching Assistant for **Optics Laboratory**, instructor: Dr. Reza Safian
- Teaching Assistant for **Modern Optics Laboratory**, instructor: Dr. Reza Safian
- Teaching Assistant for **Advanced Engineering Mathematics**, instructor: Abolghasem Zeidaabadi Neghad

Under-Graduate Students

2014-2019

- Teaching Assistant and Grader for **Engineering Electromagnetics**, instructor: Dr. Reza Safian, and Dr. Ahmad Bakhtafrouz
- Instructor for **Optical Communication and Electronics Laboratory**
- Teaching Assistant and Grader for **Electrical Circuit I**, instructor: Dr. Ahmad Bakhtafrouz

AWARDS AND HONORS

- **2019-**Outstanding doctoral dissertation award supported by Iran National Science Foundation
- **2014-**Ranked 1st among the electrical engineering graduate students of ECE faculty at Isfahan University of Technology
- **2014-**Ph.D. admission with and without entrance exams: A reward from Isfahan University of Technology for selected top students
- **2012-**Ranked 2nd among electrical engineering undergraduate students of ECE faculty at Jundi Shapur University of Technology

COMPLICATIONS

Work order

2014-2018

- Optics Laboratory
- Modern Optics Laboratory
- Optical Communication and Electronics Laboratory

GRADUATE COURSES

- Advanced Engineering Mathematics, Photonics, Optical Communication Systems, Theory of Wave Scattering, Design of Active Microwave Circuits, Fourier Optics, Advanced Antenna, Theory of Manufacturing of Semiconductor Devices, Numerical of Solving of Partial and Ordinary Differential Equations, Renewable Energies, Optical Fiber, Numerical Techniques in Electromagnetics, Optical Fiber, Convex Optimization

Firenze, July 24th 2023

COMPUTER SKILLS

Specialized Software Programs

- COMSOL, Computer Simulation Technology (CST), Matrix Laboratory (MATLAB), High Frequency Structure Simulator (HFSS), Advanced Design System (ADS), LUMERICAL FDTD SOLUTIONS, LUMERICAL MODE SOLUTIONS, LUMERICAL DEVICE SOLUTIONS, SILVACO, SENTAURUS, RSOFT, OPTI-SYSTEM, OPTI-FIBER, ANTENNA MAGUS, PROTEUS, CODE-VISION, PSPICE, CVX

General Software Programs

- Cisco Packet Tracer, Microsoft Visual Studio C#, Database (PostgreSQL), Virtualization, Linux CentOS, Microsoft Office, Microsoft Windows

NON-ACADEMIC WORK EXPERIENCE

Telecommunication Engineer

- I.R. Of Iran Meteorological Organization, Iran[2018-2020]
- Telecommunication Company of Iran, Iran[2013-2015]

MEASUREMENT INSTRUMENTS

- Spectrum Analyzer, Spectrometer, Optical Interferometers, RF Power Meter, Signal Generator, Oscilloscope, Function Generator

REFERENCES

Dr. Costanza Toninelli

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- Professor at CNR/INO and European Laboratory for NonLinear Spectroscopy, University of Florence, Florence, Italy

Dr. Luca Varani

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- Professor at University of Montpellier, Southern Institute of Electronics, France

Dr. Stephane Blin

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- Associate professor at University of Montpellier, Southern Institute of Electronics, France

Dr. Abolghasem Zeidaabadi Nezhad

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- Associate Professor at Isfahan University of Technology, Electrical and Computer Engineering Department, Isfahan, Iran

Firenze, July 24th 2023