

Andrea Alù

Address

201 Lavaca Street – Apt. 315
Austin, TX 78701, U.S.A.
+1 (215) 667.4264 (Mobile)
+39 (06) 6229.6380 (VoIP)

E-mail: alu@mail.utexas.edu

URL: <http://users.ece.utexas.edu/~aalu>

ResearcherID: www.researcherid.com/rid/A-1328-2007

Office

Dept. of Electrical and Computer Engineering
The University of Texas at Austin
1 University Station C0803 – ENS 616
Austin, TX 78712, U.S.A.
+1 (512) 471.5922 (Phone)
+1 (512) 471.6598 (Fax)

RESEARCH EXPERIENCE AND INTERESTS

- Applied electromagnetics, nanoelectromagnetism
- Electromagnetic metamaterials and plasmonic nanomaterials
- Microwave, THz, infrared and optical applications of complex media, metamaterials and metasurfaces
- Theoretical acoustics
- RF antennas and circuits
- Plasmonics, nano-optics, nano-photonics and nanotechnology
- Metamaterial, plasmonic and acoustic cloaking
- Nanocircuits and nanostructures modeling
- Miniaturized RF antennas and optical nanoantennas
- Optical properties, biological and biomedical applications of plasmonic nanoparticles
- Photonics and materials science
- Metal-dielectric nanocomposites and thin metal films
- Electromagnetic and photonic crystals
- Analysis and synthesis of planar and conformal integrated components and phased antenna arrays at radio-frequency
- Theoretical and numerical methods for electromagnetics

EDUCATION

April 27, 2007: PhD in Engineering of Biomedical Electronics, Electromagnetics and Telecommunications
University of Roma Tre – Rome, Italy
Thesis dissertation in Electromagnetics: ***“Metamaterials for Radiating Setups, Planar and Conformal Antennas”***
Advisors: ***Prof. Lucio Vegni*** (University of Roma Tre) and ***Prof. Nader Engheta*** (University of Pennsylvania).
Research activity on:

- electromagnetic applications of metamaterials at microwave, THz, infrared and optical frequencies
- planar and conformal integrated antennas and circuits
- numerical methods for electromagnetics.

A portion of my PhD research has been conducted at the University of Pennsylvania as a Visiting Graduate Student in Prof. Engheta’s group.
Teaching and tutoring activity at the University of Roma Tre and University of Pennsylvania:

- Electromagnetic Field Theory classes (University of Roma Tre)
- Electromagnetic Field Theory 2 classes (University of Roma Tre)
- Electromagnetic Compatibility classes (University of Roma Tre)
- Electricity and Magnetism (University of Roma Tre)
- Bio-electromagnetics classes (University of Roma Tre)
- Electromagnetics 510 (University of Pennsylvania).

I have tutored 20 MS students for their final research dissertation (University of Roma Tre).

I have tutored undergraduate, MS and PhD students for their research projects (University of Pennsylvania).

- Feb. 10, 2004:** MS degree in Environmental Engineering and Economics
University of Roma Tre – Rome, Italy
 Thesis dissertation in Environmental Electromagnetics: **“Technical and Economic Design of Radio-Base Station and Mobile Handset Antennas for UMTS Applications”**
 Advisor: Prof. Lucio Vegni
- Jan. 28, 2002:** Aptitude to the profession of Engineer (100/100 mark)
- July 17, 2001:** *Laurea* degree in Electronic Engineering (five-year coursework), specializing in Electromagnetics Applied to Telecommunications
University of Roma Tre – Rome, Italy
 Advisor: Prof. Lucio Vegni; Co-advisor: Dr. Filiberto Bilotti.
 Summa cum laude and honors (110/110 e lode), 28 classes with a mark average of 29.714/30 and 15 lodi (additional honors points). **Awarded as the highest mark average in engineering all over Italy.**
 Thesis dissertation in Electromagnetic Fields **“Design of conformal antennas loaded by complex substrates in a generalized reference system for satellite applications”**, awarded **the best thesis dissertation in electrodynamics all over Italy.**

SCIENTIFIC HONORS, AWARDS AND RECOGNITIONS

- September 26, 2008:** Metamaterials Reviewer Award 2008
Journal Metamaterials
 For outstanding contribution to the peer-review process.
- September 17, 2008:** Leopold B. Felsen Award for Excellence in Electrodynamics
University of Siena
 For his scientific contribution to various aspects of electromagnetic theory, with particular attention to wave interaction in complex environments.
- August 20, 2007:** ISAP Young Scientist Travel Grant
Organizing Committee of the 2007 International Symposium on Antennas and Propagation – Niigata, Japan
 With the paper: A. Alù, N. Engheta, **“Nanovortices around Resonant Optical Nanoantennas with Higher Directivities,”** Proceedings of 2007 International Symposium on Antennas and Propagation (ISAP2007), Toki Messe, Niigata, Japan, August 20-24, 2007, (invited paper).
- July 26, 2007:** Union Radio-Scientifique Internationale (URSI) Young Scientist Award
URSI Commission B and the Local Organizing Committee of the 2007 International Electromagnetic Theory Symposium – Ottawa, Canada
 With the paper: A. Alù, N. Engheta, **“Intrinsic Robustness over Variations of the Design Parameters in Metamaterial Cloaking,”** Proceedings of the International Symposium on Electromagnetic Theory (EMTS 2007), Ottawa, ON, Canada, July 26-28, 2007, (invited paper).
- October 10, 2006:** Incubic/Milton Chang Travel Award
Optical Society of America Member & Education Services Council
For scientific merit, to support the participation to Frontiers in Optics 2006, The 90th Annual OSA Meeting, Laser Science XXII, Rochester, NY, October 8-12, 2006.
- October 23, 2005:** Union Radio-Scientifique Internationale (URSI) Young Scientist Award
URSI General Assembly Young Scientist Award Panel – New Delhi, India

With the paper: A. Alù, N. Engheta, **“Low-Damping Guided Modes along Nano-Transmission Lines with Chains of Quadrupolar Resonant Plasmonic Nano-Particles,”** Proceedings of the 28th General Assembly of the International Union of Radio Science (URSI), New Delhi, India, October 23-29, 2005.

- July 15, 2005:** IEEE Antennas and Propagation Society (AP-S) Travel Grant
IEEE and National Science Foundation – Piscataway, NJ, USA
“For technical merit”, to support the participation to the IEEE Antennas and Propagation Society (AP-S) Student Contest Award in Washington, DC.
- July 6, 2005:** IEEE Antennas and Propagation Society (AP-S) Student Contest Award
IEEE Antennas and Propagation Society – Washington, DC, USA
Finalist, with the paper: A. Alù, N. Engheta, **“Sub-wavelength Focusing and Negative Refraction along Positive-Index and Negative-Index Plasmonic Nano-Transmission Lines and Nano-Layers,”** Proceedings of 2005 IEEE Antennas and Propagation Society (AP-S) International Symposium, Washington, DC, USA, July 3-8, 2005, pp. 35-38, (invited paper).
- March 15, 2005:** European School of Antennas Study Grant
Antennas Virtual Center of Excellence, University of Siena – Siena, Italy
For his scientific record, to promote the attendance of the short course "High-frequency technique and traveling wave antennas" framed in the European School of Antennas.
- Sept. 9, 2004:** SUMMA Graduate Fellowship in Advanced Electromagnetics
SUMMA Foundation – Albuquerque, NM, USA
“Awarded to promote exceptionally creative contributions to the advancement of electromagnetic theory and applications”, with the project proposal “Complex Materials with Double-Negative and Single-Negative Parameters and their Electromagnetic Applications”.
- June 23, 2004:** IEEE Antennas and Propagation Society (AP-S) Student Contest Award
IEEE Antennas and Propagation Society – Monterey, CA, USA
Finalist, with the paper: A. Alù, N. Engheta, **“Metamaterial Bilayers for Enhancement of Wave Transmission through a Small Hole in a Flat Perfectly Conducting Screen,”** in Proceedings of 2004 IEEE Antennas and Propagation Society (AP-S) International Symposium, Monterey, CA, USA, June 20-26, 2004, pp. 3163-3166, (invited paper).
- June 23, 2004:** Raj Mittra Travel Grant (RMTG) Junior Researcher Travel Award
RMTG Committee – Houston, TX, USA
“For his scientific record”, to attend the 2004 IEEE Antennas and Propagation Society (AP-S) International Symposium and USNC/CNC/URSI National Radio Science Meeting, Monterey, CA, USA, June 20-26, 2004.
- May 23, 2004:** Union Radio-Scientifique Internationale (URSI) Young Scientist Award
URSI Commission B and the Local Organizing Committee of the 2004 International Symposium on Electromagnetic Theory – Pisa, Italy
With the paper: A. Alù, N. Engheta, **“Tunneling and ‘Growing Evanescent Envelopes’ in a Pair of Cascaded Sets of Frequency-Selective Surfaces in Their Band Gaps,”** in Proceedings of 2004 International Symposium on Electromagnetic Theory, Pisa, Italy, May 23--27, 2004, pp. 90-92, (invited paper).
- June 25, 2003:** IEEE Antennas and Propagation Society (AP-S) Student Contest Award
IEEE Antennas and Propagation Society – Columbus, OH, USA
Second prize, with the paper: A. Alù, N. Engheta, **“Mode Excitation by a Line Source in a Parallel-Plate Waveguide Filled with a Pair of Parallel Double-Negative and Double-Positive Slabs,”** Proceedings of 2003 IEEE Antennas and Propagation Society (AP-S) International Symposium, Columbus, OH, USA, June 22-27, 2003, Vol. III, pp. 359-362, (invited paper).
- Feb. 22, 2002:** Scipione Bobbio Award

IDIS Foundation “Città della Scienza”, together with Campania Region, City of Naples, University of Naples “Federico II” and Province of Naples – Naples, Italy

“Awarded to the best research dissertation in Electrodynamics discussed in 2001 all over Italy”, with the *laurea* dissertation “Design of conformal antennas on complex substrates in generalized geometry for satellite applications”.

Oct. 24, 2001: Isabella Sassi Bonadonna Scholarship
Italian Electrical and Electronics Society (AEI) – Milan, Italy
“Awarded to the best proposal for a yearlong research project to be developed abroad”. The project has been developed at the University of Pennsylvania, under the supervision of Prof. Nader Engheta.

Sep. 27, 2001: Galluzzi for Engineering Award
EniTecnologie, National Institute for the Physics of the Matter (INFN), University of Roma Tre – Rome, Italy
“Awarded, after graduation, to the student with the highest average mark in engineering all over Italy”.

GRANT SUPPORT

February 19, 2009: Faculty Travel Grant
University of Texas at Austin

RESEARCH AND WORK EXPERIENCE

Jan. 16, 2009-Present: Assistant Professor (Tenure-Track)
University of Texas at Austin – Austin, TX
Department of Electrical and Computer Engineering
Applied Research Laboratories
Courses:

- EE383V: Electromagnetic Materials, Spring 2009.

May 2008-Present: Research Consultant
Eureka Aerospace – Pasadena, CA
Research activity on:

- Camera filter design
- Acoustic cloaking
- Electrically small antennas
- Metamaterials
- Plasmonics, optics

Jan. 2007-Dec. 2008: Postdoctoral researcher
University of Pennsylvania – Philadelphia, PA
Supervisor: Prof. Nader Engheta
Research activity on:

- Metamaterial and plasmonic cloaking;
- Optical nanocircuits and modeling of nanostructures at IR and optical frequencies;
- Supercoupling and anomalous resonances within plasmonic and metamaterial channels;
- Metamaterials, nanomaterials and metasurfaces;
- Plasmonics, nanooptics, nanophotonics.

Lecturing and tutoring activity in:

- ESE 411 (Wireless Communications).

Tutoring Bachelor, MS and PhD students on several research projects involving plasmonics and metamaterials.

Nov. 2007-Dec. 2008: Research Consultant

University of Roma Tre – Roma, Italy

Research activity on:

- Metamaterial modeling.

Financial sponsors: European Network of Excellence “METAMORPHOSE – Metamaterials Organized for Radio, Millimeter Wave and Photonics Superlattice Engineering”.

Mar. 2006-Feb. 2007: Adjunct Professor

University of Roma Tre – Rome, Italy

For the class “Electromagnetic Field Theory 2”.

Lecturing, examining and tutoring students for the course and for their final graduation.

July 2006-Dec. 2006: Visiting graduate student

University of Pennsylvania – Philadelphia, PA

Supervisor: Prof. Nader Engheta.

Research activity on:

- Plasmonic resonances and anti-resonances using metamaterials;
- Negative index metamaterials;
- Metamaterials for antenna applications at RF and optical frequencies.

Lecturing and tutoring activity in:

- ESE 510 (Electromagnetic Course).

Tutoring Bachelor, MS and PhD students on several research projects involving plasmonics and metamaterials.

June 2006-Dec. 2006: Lecturer and tutor

University of Roma Tre – Rome, Italy

For the courses: “Electromagnetic Field Theory” and “Electricity and Magnetism”.

Lecturing, examining and tutoring students for the courses and for their final graduation and dissertation.

Feb. 2004-June 2006: Research consultant

Elettronica S.p.A.

Design and realization of broadband printed antennas and phased arrays in circular and double polarization. Design and realization of the associated feeding system.

Mar. 2006-May 2006: Research consultant

University of Roma Tre – Rome, Italy

Financial sponsor: European Network of Excellence “METAMORPHOSE – Metamaterials Organized for Radio, Millimeter Wave and Photonics Superlattice Engineering”.

April 2003-Mar. 2006: Research consultant

Province of Rome, Italy

Design and validation of electromagnetic software for evaluating the electromagnetic field induced in the environment by radio and TV broadcast antennas.

July 2005-Dec. 2005: Visiting graduate student

University of Pennsylvania – Philadelphia, PA

Supervisor: Prof. Nader Engheta.

Research activity on:

- Low-observability and non-invasive probing;
- Metamaterial applications at microwave and optical frequencies.

April 2005-June 2005: Research Consultant

University of Roma Tre – Rome, Italy

Financial sponsor: European Network of Excellence “METAMORPHOSE – Metamaterials Organized for Radio, Millimeter Wave and Photonics Superlattice Engineering”.

Aug. 2004-Jan. 2005: Visiting graduate student

University of Pennsylvania – Philadelphia, PA

Supervisor: Prof. Nader Engheta.

Research activity on:

- Super-diffraction microwave imaging;
- Metamaterial applications at microwave and optical frequencies.

April 2003-Oct. 2003: Research consultant

Animal Registry Office Consortium (Co. An. An.) – Rome, Italy

Design and modeling of transponders and antennas for wireless electronic animal identification

Feb. 2003-Feb. 2004: Tutor and teaching assistant

University of Roma Tre – Rome, Italy

Tutor of MS students in Environmental Engineering and Economics

June 2002-Sept. 2002: Research consultant

Intercollegiate research centre on Environment Polluting Agents (CIRLAF) – Rome, Italy

Design of new-conception radiating elements for UMTS applications, in particular fractal and conformal antennas in 3-G radio-base and handset systems

Oct. 2001-Nov. 2002: Visiting graduate student

University of Pennsylvania – Philadelphia, PA, USA

Supervisor: Prof. Nader Engheta

Research activity on:

- characterization of left-handed and double-negative materials;
- electromagnetic applications of metamaterials at optical and microwave frequencies.

July 2001- Oct. 2001: Research and teaching assistant

University of Roma Tre – Rome, Italy

Laboratory of Applied Electromagnetics, Department of Electronics Engineering

Supervisor: Prof. Lucio Vegni

Research activity on:

- conformal antennas and circuits loaded by complex materials;
- numerical modeling of electromagnetic components.

March 2001: Consultant in a work stage

Accenture – Nice and Sophia Antipolis, France

TEACHING EXPERIENCE

Spring 2009: EE383V (Electromagnetic Metamaterials)

University of Texas at Austin – Austin, TX

Artificial materials and metamaterials, advanced electromagnetics, plasmonics.

Jan. 2008-June 2008: Lectures in ESE 411 (Wireless Communications)

University of Pennsylvania – Philadelphia, PA

Transmission-line equations, Smith chart, matching and tuning.

Mar. 2006-Feb. 2007: Professor of Electromagnetic Field Theory 2

University of Roma Tre – Rome, Italy

Electromagnetic fields, special materials, metamaterials, nanotechnology, nanophotonics, advanced research topics on electromagnetics.

- Oct. 2006-Nov. 2006:** Lectures in ESE 510 (Graduate Electromagnetics)
University of Pennsylvania – Philadelphia, PA
Maxwell equations, dielectrics and insulators, Green's functions and electromagnetic potentials.
- July 2001-July 2006:** Lectures and exams in Electromagnetic Field Theory
University of Roma Tre – Rome, Italy
Maxwell equations, transmission lines, RF circuits, waveguides, antennas, arrays.
- Oct. 2003-July 2006:** Lectures and exams in Electromagnetic Compatibility
University of Roma Tre – Rome, Italy
Coupling among RF circuits, shielding mechanisms.
- Oct. 2005-July 2006:** Lectures and exams in Electricity and Magnetism
University of Roma Tre – Rome, Italy
Electromagnetics, basic circuits, telecommunications.
- Oct. 2003-July 2005:** Lectures and exams in Bioelectromagnetics
University of Roma Tre – Rome, Italy
Influence of electromagnetic fields on biological systems.

PATENTS

- P1.** United States Patent No. 7218190, with title '**Waveguides and scattering devices incorporating epsilon-negative and/or mu-negative slabs,**' joint inventors: Andrea Alù and Nader Engheta, assignee: The Trustees of the University of Pennsylvania, May 15, 2007, online at: <http://www.uspto.gov/patft/index.html>.
- P2.** United States Patent Application No. 2006091215, with title '**Optical circuits and circuit elements and methods of forming same,**' joint inventors: Nader Engheta, Alessandro Salandrino and Andrea Alù, assignee: The Trustees of the University of Pennsylvania, Aug. 31, 2006, pending.

FINANCED RESEARCH PROJECTS

- 2004-2006:** European Network of Excellence "METAMORPHOSE – METAMaterial ORganized for radio, millimetre wave, and PHOTonic Superlattice Engineering"
European Community in the framework of the Sixth Program – Contract Number NMP3-CT-2004-500252
Scientific Coordinator: Prof. Lucio Vegni (University of Roma Tre, Rome, Italy)
- 2005:** SUMMA Graduate Fellowship in Advanced Electromagnetics
SUMMA Foundation – Albuquerque, NM, USA
Complex Materials with Double-Negative and Single-Negative Parameters and their Electromagnetic Applications
- 2003-2005:** Analysis of the Electromagnetic Radio-Frequency Pollution – II part
Province of Rome, Italy
Scientific Coordinator: Prof. Paolo Bernardi (University of La Sapienza, Rome, Italy)
- 2004:** Synthesis of Prediction Models for the Electromagnetic Fields Induced by an RFID Detector
Animal Registry Office Consortium
Scientific Coordinator: Prof. Lucio Vegni (University of Roma Tre, Rome, Italy)

- 2002-2004: Design of Antennas for UMTS Handsets
Italian Ministry of Communications
 Scientific Coordinator: Prof. Lucio Vegni (University of Roma Tre, Rome, Italy)
- 2002: Isabella Sassi Bonadonna Fellowship
Italian Electrical and Electronics Society (AEI) – Milan, Italy
 Application of special materials and metamaterials to RF antennas
- 2002-2004: Design of Antennas for UMTS Radio-Base Stations
Italian Ministry of Communications
 Scientific Coordinator: Prof. Lucio Vegni (University of Roma Tre, Rome, Italy)

INVITED LECTURES, SEMINARS AND TUTORIALS

- June 11, 2008: “Plasmonic and metamaterial cloaking: a route for acoustic cloaks?”
Applied Research Laboratories, University of Texas at Austin, Austin, TX, U.S.A.
- March 6, 2008: “Plasmonic and metamaterial cloaking: fundamental principles, salient features and future trends”
Department of Electrical and Computer Engineering, University of Texas at Austin, Austin, TX, U.S.A.
- July 22, 2005: “DNG and SNG metamaterials for microwave applications: rectangular and circular patch antenna design”
2005 Distributed European Doctoral School on Metamaterials (organized by METAMORPHOSE Network of Excellence) – San Sebastian, Spain
- July 22, 2005: “DNG and SNG metamaterials for microwave applications: polariton and leaky wave antenna design”
2005 Distributed European Doctoral School on Metamaterials (organized by METAMORPHOSE Network of Excellence) – San Sebastian, Spain
- Oct. 8, 2004: “Metamaterials: Applications and Technologies”
Secondo Convegno Nazionale delle Microonde nell'Ingegneria e nelle Scienze Applicate (MISA 2004) – Ancona, Italy

CONFERENCE TALKS

- T1. “*Antenna Matching in ϵ -Near-Zero Metamaterial Channels,*” iWAT2009: "Small Antennas and Novel Metamaterials", Santa Monica, CA, March 2-4, 2009, (invited talk).
- T2. “*Plasmonic Cloaking: Fundamentals and Novel Potential Applications,*” Metamaterials'2008, Pamplona, Spain, September 23-26, 2008, (invited talk).
- T3. “*Transmission-Line Modeling of ENZ-based Supercoupling in Waveguide Transition Channels and Bends,*” Metamaterials'2008, Pamplona, Spain, September 23-26, 2008.
- T4. “*Limitations of Plasmonic Cloaking at Microwave and Optical Frequencies,*” URSI General Assembly, Chicago, IL, USA, p. 83, August 8-16, 2008.
- T5. “*Antennas in Epsilon-Near-Zero Metamaterials Filling Narrow Waveguide Channels and Bends,*” USNC/URSI National Radio Science Meeting, San Diego, CA, USA, July 5-12, 2008.
- T6. “*Isotropic Low-Loss Negative-Index Metamaterial at Optical Frequencies: Theory and Simulations,*” USNC/URSI National Radio Science Meeting, San Diego, CA, USA, July 5-12, 2008.
- T7. “*Dependence and Sensitivity of Plasmonic Cloaking upon Size and Geometry,*” USNC/URSI National Radio Science Meeting, San Diego, CA, USA, July 5-12, 2008.

- T8. ***“Three-Dimensional Plasmonic Nanoswitch: Extreme Variation of Scattering Properties upon Rotation,”*** IEEE Antennas and Propagation Society (AP-S) International Symposium, San Diego, CA, USA, July 5-12, 2008.
- T9. ***“Scattering Cancellation Using Plasmonic Cloaks,”*** NATO Advanced Research Workshop, Metamaterials for Secure Information and Communication Technologies, Marrakech, Morocco, p. 31, May 7-10, 2008.
- T10. ***“Dispersion Characteristics of Metamaterial Cloaking Structures,”*** Metamaterials’2007, Roma, Italy, pp. 482-485, October 22-26, 2007.
- T11. ***“Cloaking an Object Near an Obstacle with Plasmonic Materials,”*** 2007 OSA Annual Meeting, Frontiers in Optics, San Jose, CA, U.S.A., Paper No. FThU5, September 16-20, 2007.
- T12. ***“Nanoconnectors at Optical Frequencies,”*** 2007 OSA Annual Meeting, Frontiers in Optics, San Jose, CA, U.S.A., Paper No. FThR2, September 16-20, 2007.
- T13. ***“Nanovortices around Resonant Optical Nanoantennas with Higher Directivities,”*** 2007 International Symposium on Antennas and Propagation (ISAP2007), Toki Messe, Niigata, Japan, p. 238, August 20-24, 2007.
- T14. ***“Q-Factor of Metamaterial and Plasmonic ‘Complementary’ Resonances,”*** International Symposium on Electromagnetic Theory (EMTS 2007), Ottawa, ON, Canada, July 26-28, 2007.
- T15. ***“Intrinsic Robustness over Variations of the Design Parameters in Metamaterial Cloaking,”*** International Symposium on Electromagnetic Theory (EMTS 2007), Ottawa, ON, Canada, July 26-28, 2007.
- T16. ***“Plasmonic Waveguides with Lateral Confinement: a Comparison among Different Geometries,”*** USNC/CNC/URSI National Radio Science Meeting, Ottawa, ON, Canada, July 22-26, 2007.
- T17. ***“Transparency and Cloaking for Collections of Particles with Plasmonic Metamaterial Covers,”*** USNC/CNC/URSI National Radio Science Meeting, Ottawa, ON, Canada, July 22-26, 2007.
- T18. ***“Plasmonic Capacitor for Realization of a Compact Inductor,”*** USNC/CNC/URSI National Radio Science Meeting, Ottawa, ON, Canada, July 22-26, 2007.
- T19. ***“Wave Propagation along Periodic Arrays and Lattices of Metamaterial Particles with Dominant Higher-Order Multipolar Polarizabilities,”*** Progress in Electromagnetics Research Symposium (PIERS’07), Beijing, China, p. 466, March 26-30, 2007.
- T20. ***“Coupled Resonances to Increase Bandwidths of Metamaterial Antennas,”*** 2006 OSA Annual Meeting, Frontiers in Optics, Rochester, NY, USA, Paper No. FTuC2, October 8-12, 2006.
- T21. ***“Salient Features of Cylindrical Leaky-Wave Antennas with Metamaterial Loadings,”*** USNC/CNC/URSI National Radio Science Meeting, Albuquerque, NM, USA, p. 699, July 9-14, 2006.
- T22. ***“Plasmonic Resonances in an ϵ -Negative Host Medium: Metamaterials at Optical Frequencies for Nano-Optics and Nanotechnology,”*** 2006 IEEE Antennas and Propagation Society (AP-S) International Symposium, Albuquerque, NM, USA, pp. 745-748, July 9-14, 2006.
- T23. ***“Low-Damping Guided Modes along Nano-Transmission Lines with Chains of Quadrupolar Resonant Plasmonic Nano-Particles,”*** 28th General Assembly of the International Union of Radio Science (URSI), New Delhi, India, Paper No. 99, October 23-29, 2005.
- T24. ***“Anomalous Radiation Properties of Cylindrical Metamaterial Leaky-Wave Antennas,”*** International Conference on Electromagnetics in Advanced Applications (ICEAA’05), Turin, Italy, pp. 575-578, September 12-16, 2005.
- T25. ***“Radiation Properties of Sub-Wavelength Resonant Patch Antennas Filled with a Pair of DPS, DNG, and/or SNG Metamaterial Blocks,”*** USNC/CNC/URSI National Radio Science Meeting, Washington, DC, USA, p. 113, July 3-8, 2005.
- T26. ***“Sub-wavelength Focusing and Negative Refraction along Positive-Index and Negative-Index Plasmonic Nano-Transmission Lines and Nano-Layers,”*** 2005 IEEE Antennas and Propagation Society (AP-S) International Symposium, Washington, DC, USA, Vol. 1A, pp. 35-38, July 3-8, 2005.
- T27. ***“Analysis of Conformal Antennas in Spheroidal Geometries: a Mapping into Planar Components,”*** 11th International Symposium on Antenna Technology and Applied Electromagnetics (ANTEM’05), Saint-Malò, France, pp. 160-161, June 15-17, 2005.
- T28. ***“Numerical Study of Conformal Spheroidal Antennas,”*** 28th ESA Antenna Workshop on Space Antenna Systems and Technologies, Noordwijk, The Netherlands, Vol. 2, pp. 1069-1072, May 31-June 3, 2005.

- T29. *“Conformal Omni-Directional Leaky-Wave Radiators with Down-Tilted Beams Employing Cylindrical Metamaterial Covers,”* 4th European Workshop on Conformal Antennas, Stockholm, Sweden, pp. 117-120, May 23-24, 2005.
- T30. *“Potential Antenna Applications of Metamaterials,”* European Cooperation in the field of Scientific and Technical Research (COST) Action 284, 7th Management Committee Business Meeting, Chexbres, Switzerland, March 2-4, 2005
- T31. *“L’impiego di Metamateriali per Aumentare Considerevolmente la Trasmissione attraverso un Piccolo Foro in uno Schermo Opaco,”* XV Riunione Nazionale di Elettromagnetismo Applicato, Cagliari, Italy, pp. 370-380, September 13-16, 2004.
- T32. *“FDTD Simulation of Tunneling and ‘Growing Exponential’ in a Pair of ϵ -negative and μ -negatives slabs,”* USNC/CNC/URSI National Radio Science Meeting, Monterey, CA, USA, p.18, June 20-26, 2004.
- T33. *“Metamaterial Bilayers for Enhancement of Wave Transmission through a Small Hole in a Flat Perfectly Conducting Screen,”* 2004 IEEE Antennas and Propagation Society (AP-S) International Symposium, Monterey, CA, USA, Vol. 3, pp. 3163-3166, June 20-26, 2004.
- T34. *“Tunneling and ‘Growing Exponential Envelopes’ in a Pair of Cascaded Sets of Frequency Selective Surfaces in their Band Gaps,”* 2004 URSI International Symposium on Electromagnetic Theory, Pisa, Italy, pp. 90-92, May 23-27, 2004.
- T35. *“Metamaterial Monolayers and Bilayers for Enhanced Transmission through a Sub-Wavelength Aperture in a Flat Perfectly Conducting Screen,”* IX Workshop on Microwave Engineering, Metamaterials and special materials for electromagnetic applications and TLC, Roma, Italy, p. 7, April 5, 2004, (*invited paper*).
- T36. *“Anomalies in the Surface Wave Propagation along Double-Negative and Single-Negative Cylindrical Shells,”* Progress in Electromagnetics Research Symposium (PIERS’04), Pisa, Italy, CD Digest, March 28-31, 2004, (*invited paper*).
- T37. *“How Metamaterials May Significantly Affect the Wave Transmission through Sub-Wavelength Hole in a Flat Perfectly Conducting Screen,”* IEE Seminar on Metamaterials for Microwave and (Sub) millimetre Wave Applications: Photonic Bandgap and Double Negative Designs, Components and Experiments, London, UK, pp. 11/1-11/6, November 24, 2003.
- T38. *“Conformal Antennas and Complex Materials: a Method of Line Numerical Analysis,”* 3rd European Workshop on Conformal Antennas (EWCA’03), Bonn, Germany, pp. 41-44, October 22-23, 2003.
- T39. *“Power-Transmission Enhancement through a Sub-Wavelength Hole in a Perfect Conductor by Employing Metamaterials,”* New Frontiers in Radiation and Guidance Phenomena, Rome, Italy, September 29-30, 2003.
- T40. *“Method of Lines Algorithm Applied to Conformal Microwave Components with Complex Loading Media,”* International Conference on Electromagnetics in Advanced Applications (ICEAA’03), Turin, Italy, pp. 217-220, September 8-12, 2003.
- T41. *“Mode Excitation by a Line Source in a Parallel-Plate Waveguide Filled with a Pair of Parallel Double-Negative and Double-Positive Slabs,”* 2003 IEEE Antennas and Propagation Society (AP-S) International Symposium, Columbus, OH, USA, Vol. 3, pp. 359-362, June 22-27, 2003.
- T42. *“Design of Polygonal Patch Antennas with a Broad-Band Behavior via a Proper Perturbation of Conventional Rectangular Radiators,”* 2003 IEEE Antennas and Propagation Society (AP-S) International Symposium, Columbus, OH, USA, Vol. 2, pp. 268-271, June 22-27, 2003.
- T43. *“Effect of Complex Material Cover on Microstrip Patch Antennas,”* 2002 USNC/URSI National Radio Science Meeting, San Antonio, TX, USA, p.114, June 16-21, 2002.
- T44. *“Microwave Conformal Components with Bianisotropic Media,”* 2002 USNC/URSI National Radio Science Meeting, San Antonio, TX, USA, p.113, June 16-21, 2002.
- T45. *“Generalized Transmission Line and Helmholtz Equations for the Analysis of Integrated Conformal Circuits and Antennas,”* International Conference on Electromagnetics in Advanced Applications (ICEAA’01), Turin, Italy, September 10-14, 2001.

MEMBERSHIPS AND AFFILIATIONS

- Institute of Electrical and Electronics Engineering (IEEE)
- IEEE Antennas and Propagation Society (IEEE AP-S)

- IEEE Communications Society
- Optical Society of America (OSA)
- American Association for the Advancement of Science (AAAS)

CONFERENCE COMMITTEES

- Sep. 20–23, 2009: *IEEE 70th Vehicular Technology Conference*
Anchorage, AK, U.S.A.
Technical Program Committee Member
- Aug. 30–Sept. 4, 2009: *Metamaterials'2009*
London, United Kingdom
Technical Program Committee Member
- March 2–4, 2009: *2009 IEEE International Workshop on Antenna Technology (iWAT2009): "Small Antennas and Novel Metamaterials"*
Santa Monica, CA, U.S.A.
Technical Program Committee Member
- March 30-31, 2006: *3rd Workshop on Metamaterials and Special Materials for Electromagnetic Applications and TLC*
Roma, Italy
Organizing Committee Member

CHAIRMAN AND SESSION ORGANIZER AT INTERNATIONAL CONFERENCES

- Aug. 30–Sept. 4, 2009: *Metamaterials'2009*, London, U.K. (Chairman and Session Organizer)
Session title: *Cloaking and coordinate-transformation optics*
Session title: *Extreme-paraemter metamaterials*
- June 1-5, 2009: *IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting*, Charleston, SC, U.S.A.
Session title: *Cloaking, tunneling and transformation EM*
- September 25, 2008: *Metamaterials'2008*, Pamplona, Spain
Session title: *Cloaking*
- October 23, 2007: *Metamaterials'2007*, Roma, RM, Italy
Poster session
- July 22, 2007: *USNC/CNC/URSI National Radio Science Meeting*, Ottawa, ON, Canada
Session title: *Complex Media*

EXAMINER FOR DOCTORAL DISSERTATIONS

- P. Alitalo, "*Microwave transmission-line networks for backward-wave media and reduction of scattering*," Helsinki University of Technology (TKK), Helsinki, Finland.

REVIEWER FOR INTERNATIONAL CONFERENCES

- *IEEE 70th Conference on Vehicular Technology 2009*, Anchorage, AK, USA, Sept. 20-23, 2009

- *Metamaterials'2009*, London, United Kingdom, September 1-4, 2009
- *International Workshop on Antenna Technology (iWAT2009): "Small Antennas and Novel Metamaterials"*, Santa Monica, CA, March 2-4, 2009
- *Metamaterials'2008*, Pamplona, Spain, September 23-26, 2008
- *URSI General Assembly*, Chicago, IL, USA, August 8-16, 2008.
- *URSI National Radio Science Meeting*, Boulder, CO, USA, January 3-6, 2008.

ACTIVE PEER REVIEWER

- Physical Review Letters
- Physical Review B
- Physical Review E
- Materials Today
- Applied Physics Letters
- Journal of Applied Physics
- Journal of the Optical Society of America B
- Optics Express
- Optics Communications
- Optics Letters
- Applied Optics
- IEEE Transactions on Antennas and Propagation
- IEEE Transactions on Microwave Theory and Techniques
- IEEE Transactions on Nanotechnology
- IEEE Antennas and Wireless Propagation Letters
- IEEE Microwave and Wireless Components Letters
- IEEE OSA Journal of Lightwave Technology
- IEEE Antennas and Propagation Magazine
- IET Electronics Letters
- IET Microwaves, Antennas and Propagation
- New Journal of Physics
- Journal of Optics A: Pure and Applied Optics
- Journal of Physics D: Applied Physics
- Journal of Electromagnetic Waves and Applications
- Progress in Electromagnetics Research (PIER) Book
- International Journal of Infrared and Millimeter Waves
- Journal of Physics and Chemistry of Solids
- European Physical Journal B
- Radio Science
- Metamaterials Journal
- Electromagnetics
- Journal of Nanotechnology
- RadioEngineering

SCIENTIFIC PUBLICATIONS

• Peer-Reviewed Journals and Transactions

- J1. B. Edwards, A. Alù, M. G. Silveirinha, and N. Engheta, “*Experimental Verification of Plasmonic Cloaking at Microwave Frequencies*,” *Nature Materials*, under review.
- J2. D. A. Powell, A. Alù, B. Edwards, A. Vakil, Y. S. Kivshar, and N. Engheta, “*Nonlinear Control of Tunneling Through an ϵ -Near-Zero Channel*,” *Physical Review B*, under review.
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- Prof. Nader Engheta, H. Nedwill Ramsey Professor of Electrical and Systems Engineering, and Professor of Bioengineering, University of Pennsylvania, 200 South 33rd Street, Philadelphia, PA 19103, email: engheta@ce.upenn.edu
- Prof. Richard W. Ziolkowski, Litton Industries John M. Leonis Distinguished Professor of Electrical and Computer Engineering and Professor in College of Optical Sciences, University of Arizona, 1230 East Speedway, Tucson, AZ 85721, email: ziolkowski@ece.arizona.edu
- Prof. Lucio Vegni, Full Professor of Electromagnetic Field Theory, and President of the Study Council, University of Roma Tre, via della Vasca Navale, 84, Roma, RM 00146, Italy, email: vegni@uniroma3.it
- Dr. Arthur D. Yaghjian, Air Force Research Laboratory, Hanscom AFB, email: a.yaghjian@verizon.net
- Dr. James Tatoian, Chairman and CEO, Eureka Aerospace Corporation, 3452 East Foothill Blvd, Suite 340, Pasadena, CA 91107-3160, email: tatoian@eurekaaerospace.com
- Prof. Ahmad Hoorfar, Full Professor of Electrical and Computer Engineering, Director of Antenna Research Laboratory, Villanova University, 800 Lancaster Avenue, Villanova, PA 19085, email: hoorfar@ece.vill.edu
- Prof. Scott Tyo, Associate Professor of Optical Sciences, and Associate Professor of Electrical and Computer Engineering, University of Arizona, 1630 East University Boulevard, Tucson, AZ 85721, email: tyo@optics.arizona.edu