

1. DOMENICO PACIFICI

Assistant Professor, Brown University, School of Engineering
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RESEARCH INTERESTS

Domenico Pacifici is currently leading research projects aimed at the exploitation of photons and surface plasmons in nanostructured materials for information, sensing and energy-harvesting solutions. Recently, the Pacifici Group has demonstrated: (1) plasmonic concentrators for broadband enhanced absorption in ultra-thin film solar cells, (2) germanium quantum dot photodetectors with responsivity and quantum efficiency rivaling those of conventional technologies, and (3) high-throughput biochemical sensors using plasmonic interferometers integrated on-chip for detection of extremely low glucose concentrations, typically found in saliva, for non-invasive glucose screening.

2. EDUCATION

UNIVERSITY OF CATANIA, Catania, Italy

Ph.D. in Physics, *cum laude* 2004

Dissertation: *Erbium-doped silicon nanoclusters for Microphotonics*, Advisor: Prof. F. Priolo
[<http://www.matis.infm.it/pdf/Pacifici-PhDThesis.pdf>]

UNIVERSITY OF CATANIA, Catania, Italy

Laurea in Physics (Master of Science), *summa cum laude* 2000

Dissertation: *Interaction between silicon nanocrystals and erbium ions*, Advisor: Prof. F. Priolo

3. PROFESSIONAL APPOINTMENTS

BROWN UNIVERSITY, Providence, RI

Assistant Professor, School of Engineering September 1st, 2009–present

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, CA

Senior Postdoctoral Scholar, Department of Applied Physics 2007–2009

Postdoctoral Scholar, Department of Applied Physics 2005–2007

UNIVERSITY OF CATANIA, Catania, Italy

Research Fellow, Department of Physics 2004–2005

Graduate Researcher, Department of Physics 2000–2003

4. PUBLICATIONS

1. J. Feng, V. Siu, A. Roelke, V. Mehta, G.T.R. Palmore, and **D. Pacifici**, “Nanoscale Plasmonic Interferometers for Multispectral, High-Throughput Biochemical Sensing,” *Nano Lett.* (Publication Date on the Web: Dec. 26, 2011).
2. S. Cosentino, P. Liu, Son T. Le, S. Lee, D. Paine, A. Zaslavsky, S. Mirabella, M. Miritello, I. Crupi, A. Terrasi, and **D. Pacifici**, *High-efficiency silicon-compatible photodetectors based on Ge quantum dots*, *Appl. Phys. Lett.* 98(22):221107 (2011)
3. A. Ostfeld and **D. Pacifici**, *Plasmonic concentrators for enhanced light absorption in ultra-thin film organic photovoltaics*, *Applied Physics Letters* 98, 113112 (2011)

4. P. N. Saeta, V. E. Ferry, **D. Pacifici**, J. N. Munday, H. A. Atwater, *How much can guided modes enhance absorption in thin solar cells?*, Optics Express 17, 20975-20990 (2009)
5. **D. Pacifici**, H. J. Lezec, L. A. Sweatlock, C. de Ruitter, V. Ferry, H. A. Atwater, *All-optical plasmonic modulators and interconnects*, in *Plasmonic Nanoguides and Circuits*, Ed. S. Bozhevolnyi, Pan Stanford Publishing Pte. Ltd. (2009)
6. M. J. Dicken, L. A. Sweatlock, **D. Pacifici**, H. J. Lezec, K. Bhattacharya, H. A. Atwater, *Electro-optic modulation in thin film barium titanate plasmonic interferometers*, Nano Letters 8, 4048-4052 (2008)
7. V. Ferry, L. A. Sweatlock, **D. Pacifici**, H. A. Atwater, *Plasmonic nanostructure design for efficient light coupling into solar cells*, Nano Letters 8, 4391-4397 (2008)
8. **D. Pacifici**, H. J. Lezec, L. A. Sweatlock, R. J. Walters, H. A. Atwater, *Universal optical transmission features in periodic and quasiperiodic hole arrays*, Optics Express 16, 9222-9238 (2008)
9. **D. Pacifici**, H. J. Lezec, H. A. Atwater, J. Weiner, *Quantitative determination of optical transmission through subwavelength slit arrays in Ag films: Role of surface wave interference and local coupling between adjacent slits*, Physical Review B 77, 115411 (2008)
10. **D. Pacifici**, *Plasmonics: A shifting perspective*, Nature Photonics 1, 689 (2007)
11. **D. Pacifici**, H. J. Lezec, H. A. Atwater, *All-Optical modulation by plasmonic excitation of CdSe quantum dots*, Nature Photonics 1, 402-406 (2007)
12. F. Iacona, A. Irrera, G. Franzò, **D. Pacifici**, I. Crupi, M. Miritello, C. Presti, F. Priolo, *Silicon-based light-emitting devices: properties and applications of crystalline, amorphous and Er-doped nanoclusters*, IEEE Journal of Selected Topics in Quantum Electronics 12, 1596 (2006)
13. R. Espiau de Lamaestre, H. Bernas, **D. Pacifici**, G. Franzò and F. Priolo, *Evidence for a "dark exciton" state of PbS nanocrystals in a silicate glass*, Applied Physics Letters 88, 181115 (2006)
14. J. S. Biteen, **D. Pacifici**, N. S. Lewis, H. A. Atwater, *Enhanced radiative emission rate and quantum efficiency in coupled Si nanocrystal-nanostructured gold emitters*, Nano Letters 5, 1768 (2005)
15. **D. Pacifici**, L. Lanza, G. Franzò, F. Iacona, F. Priolo, *Revealing the sequential nature of the Si nanocluster-Er interaction by variable pulse-duration excitation*, Physical Review B 72, 45349 (2005)
16. A. Irrera, F. Iacona, G. Franzò, S. Boninelli, **D. Pacifici**, M. Miritello, C. Spinella, D. Sanfilippo, G. Di Stefano, P.G. Fallica, F. Priolo, *Correlation between electroluminescence and structural properties of Si nanoclusters*, Optical Materials 27, 1031 (2005)
17. F. Enrichi, G. Mattei, C. Sada, E. Trave, **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, M. Prassas, M. Falconieri, E. Borsella, *Study of the energy transfer mechanism in different glasses co-doped with Si nanoaggregates and Er³⁺ ions*, Optical Materials 27, 904 (2005)
18. F. Enrichi, G. Mattei, C. Sada, E. Trave, **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, M. Prassas, M. Falconieri, E. Borsella, *Evidence of energy transfer in an aluminosilicate glass co-doped with Si nanoaggregates and Er³⁺ ions*, Journal of Applied Physics 96, 3925 (2004)

19. M. Wojdak, M. Klik, M. Forcales, O.B. Gusev, T. Gregorkiewicz, **D. Pacifici**, G. Franzò, F. Priolo, and F. Iacona, *Sensitization of Er luminescence by Si nanoclusters*, Physical Review B 69, 233315 (2004)
20. **D. Pacifici**, G. Franzò, F. Iacona, A. Irrera, S. Boninelli, M. Miritello, and F. Priolo, *Rare-earth doped Si nanostructures for Microphotonics*, Mat. Res. Soc. Symp. Vol 817 L1.2.1 (2004)
21. F. Enrichi, G. Mattei, C. Sada, E. Trave, **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, M. Prassas, M. Falconieri, and E. Borsella, *Optical and structural investigation on the energy transfer in a multicomponent glass co-doped with Si nanoaggregates and Er³⁺ ions*, Mat. Res. Soc. Symp. Vol. 817 L1.8.1 (2004)
22. A. Irrera, M. Miritello, **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, D. Sanfilippo, G. Di Stefano, P.G. Fallica, *Electroluminescence properties of SiO_x layers implanted with rare earth ions*, Nuclear Instruments and Methods in Physics Research B 216, 222 (2004)
23. L. Dal Negro, P. Bettotti, M. Cazzanelli, L. Pavesi, and **D. Pacifici**, *Applicability conditions and experimental analysis of the variable stripe length method for gain measurements*, Optics Communications 229, 337 (2004)
24. F. Enrichi, G. Mattei, C. Sada, E. Trave, E. Borsella, **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, and M. Prassas, *Luminescence properties of a multi-component glass co-implanted with Si and Er*, Solid State Phenomena 99-100, 37-40 (2004)
25. F. Enrichi, G. Mattei, C. Sada, E. Borsella, **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, and M. Prassas, *Enhancement of Er³⁺ 1.54 μm Infrared Emission in a Si and Er Co-Implanted Multicomponent Glass*, ECOC-IOOC Proceedings vol. 3, 426 (2003)
26. F. Iacona, G. Franzò, **D. Pacifici**, A. Irrera, M. Miritello, D. Sanfilippo, G. Di Stefano, P.G. Fallica, and F. Priolo, *Er-Doped Si Nanocrystals as a Candidate for Optical Amplification*, ECOC-IOOC Proceedings vol. 3, (2003)
27. F. Priolo, A. Irrera, **D. Pacifici**, M. Miritello, G. Franzò, F. Iacona, D. Sanfilippo, G. Di Stefano, P.G. Fallica, *Dispositivi emettitori di luce basati su nanocristalli di silicio*, Fotonica2003 Proceedings b4.2 (April 2003)
28. **D. Pacifici**, G. Franzò, F. Iacona, S. Boninelli, A. Irrera, M. Miritello, and F. Priolo, *Er doped Si nanostructures*, Materials Science and Engineering B 105/1-3, 197 (2003)
29. N. Daldosso, G. Das, G. Dalba, S. Larcheri, R. Grisenti, G. Mariotto, L. Pavesi, F. Rocca, F. Priolo, G. Franzò, A. Irrera, M. Miritello, **D. Pacifici**, and F. Iacona, *Silicon nanocrystal Nucleation as a Function of the Annealing Temperature in SiO_x films*, Mat. Res. Soc. Symp. Proc. Vol. 770 I1.3.1 (2003)
30. L. Dal Negro, M. Cazzanelli, N. Daldosso, L. Pavesi, F. Priolo, G. Franzò, **D. Pacifici**, and F. Iacona, *Time-resolved gain dynamics in silicon nanocrystals*, Mat. Res. Soc. Symp. Proc. Vol. 770 I3.4.1 (2003)
31. **D. Pacifici**, G. Franzò, F. Iacona, and F. Priolo, *Coupling and cooperative up-conversion coefficients in Er-doped Si nanocrystals*, Mat. Res. Soc. Symp. Proc. Vol. 770 I6.8.1 (2003)
32. M. Forcales, M. Wojdak, M. A. J. Klik, T. Gregorkiewicz, O. B. Gusev, G. Franzò, **D. Pacifici**, F. Priolo, F. Iacona, *Si nanocrystals as sensitizers for Er PL in SiO₂*, Mat. Res. Soc. Symp. Proc. Vol. 770 I6.9.1 (2003)

33. **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, and L. Dal Negro, *Modeling and perspectives of the Si nanocrystals-Er interaction for optical amplification*, Physical Review B 67, 245301 (2003)
34. L. Dal Negro, M. Cazzanelli, L. Pavesi, S. Ossicini, **D. Pacifici**, G. Franzò, and F. Priolo, *Dynamics of stimulated emission in silicon nanocrystals*, Applied Physics Letters 82, 4636 (2003)
35. G. Franzò, S. Boninelli, **D. Pacifici**, F. Priolo, F. Iacona, and C. Bongiorno, *Sensitizing properties of amorphous Si clusters on the 1.54 μm luminescence of Er in Si-rich SiO₂*, Applied Physics Letters 82, 3871 (2003)
36. A. Irrera, **D. Pacifici**, M. Miritello, G. Franzò, F. Priolo, F. Iacona, D. Sanfilippo, G. Di Stefano, P.G. Fallica, *Light emitting devices based on silicon nanocrystals*, in *Towards the first silicon laser* edited by L. Pavesi, S. Gaponenko, L. Dal Negro, NATO Science Series vol 93 (Kluwer Academic Publishers, Dordrecht 2003) pag. 29
37. L. Dal Negro, M. Cazzanelli, Z. Gaburro, P. Bettotti, L. Pavesi, F. Priolo, G. Franzò, **D. Pacifici**, F. Iacona, *Stimulated emission in silicon nanocrystals: Gain measurement and rate equation modelling*, in *Towards the first silicon laser* edited by L. Pavesi, S. Gaponenko, L. Dal Negro, NATO Science Series vol 93 (Kluwer Academic Publishers, Dordrecht 2003) pag. 145
38. N. Daldosso, G. Dalba, R. Grisenti, L. Dal Negro, L. Pavesi, F. Rocca, F. Priolo, G. Franzò, **D. Pacifici**, and F. Iacona, *X-Ray Absorption study of light emitting Si nanocrystals*, Physica E 16, 321 (2003)
39. L. Dal Negro, M. Cazzanelli, N. Dal Dosso, Z. Gaburro, L. Pavesi, F. Priolo, **D. Pacifici**, G. Franzò, and F. Iacona, *Stimulated emission in Plasma Enhanced Chemical Vapour Deposited Silicon nanocrystals*, Physica E 16, 297 (2003)
40. **D. Pacifici**, G. Franzò, F. Iacona, and F. Priolo, *Amorphization and recrystallization of ion implanted Si nanocrystals probed through their luminescence properties*, Physica E 16, 404 (2003)
41. A. Irrera, **D. Pacifici**, M. Miritello, G. Franzò, F. Priolo, F. Iacona, D. Sanfilippo, G. Di Stefano, and P.G. Fallica, *Electroluminescence properties of light emitting devices based on silicon nanocrystals*, Physica E 16, 395 (2003)
42. **D. Pacifici**, A. Irrera, G. Franzò, M. Miritello, F. Iacona, and F. Priolo, *Erbium-doped Si nanocrystals: optical properties and electroluminescent devices*, Physica E 16, 331 (2003)
43. L. Dal Negro, M. Cazzanelli, Z. Gaburro, P. Bettotti, L. Pavesi, **D. Pacifici**, G. Franzò, F. Priolo, F. Iacona, *Optical gain and stimulated emission in silicon*, Mat. Res. Soc. Symp. Proc. Vol. 738 G8.8.1 (2003)
44. A. Irrera, F. Iacona, **D. Pacifici**, M. Miritello, G. Franzò, D. Sanfilippo, G. Di Stefano, P.G. Fallica, and F. Priolo, *Tuning of the electroluminescence from Si nanocrystals through the control of their structural properties*, Mat. Res. Soc. Symp. Proc. Vol. 737 F11.9 (2003)
45. F. Priolo, F. Iacona, **D. Pacifici**, A. Irrera, M. Miritello, G. Franzò, D. Sanfilippo, G. Di Stefano, and P.G. Fallica, *Electroluminescent devices based on Er-doped Si nanoclusters*, Mat. Res. Soc. Symp. Proc. Vol. 737 F9.3 (2003)
46. L. Pavesi, L. Dal Negro, N. Daldosso, Z. Gaburro, M. Cazzanelli, F. Iacona, G. Franzò, **D. Pacifici**, F. Priolo, S. Ossicini, M. Luppi and E. Degoli "Will silicon be the photonics material

- of the third millennium?"* Proceedings of the International Conference on the Physics of Semiconductors (Edinburgh 2002)
47. L. Dal Negro, M. Cazzanelli, Z. Gaburro, L. Pavesi, **D. Pacifici**, F. Priolo, G. Franzò, and F. Iacona, *Optical gain in PECVD grown silicon nanocrystals*, in *Optical properties of nanocrystals* edited by Z. Gaburro, Proceedings of SPIE vol. 4808, 13-27 (2002)
 48. L. Rebohle, T. Gebel, J. von Borany, W. Skorupa, M. Helm, **D. Pacifici**, G. Franzò, F. Priolo, *Transient behavior of the strong violet electroluminescence of Ge-implanted SiO₂ layers*, Applied Physics B 74, 53 (2002)
 49. F. Iacona, G. Franzò, E.C. Moreira, **D. Pacifici**, F. Priolo, *Luminescence from Si Nanocrystals and Er ions embedded in resonant cavities*, Solid State Phenomena 82-84, 617 (2002)
 50. F. Iacona, G. Franzò, E.C. Moreira, **D. Pacifici**, A. Irrera, F. Priolo, *Luminescence properties of Si nanocrystals embedded in optical microcavities*, Materials Science and Engineering C 19, 377 (2002)
 51. F. Iacona, **D. Pacifici**, A. Irrera, M. Miritello, G. Franzò, F. Priolo, D. Sanfilippo, G. Di Stefano, and P.G. Fallica, *Electroluminescence at 1.54 μ m in Er-doped Si nanocluster-based devices*, Applied Physics Letters 81, 3242 (2002)
 52. A. Irrera, **D. Pacifici**, M. Miritello, G. Franzò, F. Priolo, F. Iacona, D. Sanfilippo, G. Di Stefano, and P.G. Fallica, *Excitation and de-excitation properties of silicon quantum dots under electrical pumping*, Applied Physics Letters 81, 1866 (2002)
 53. **D. Pacifici**, E.C. Moreira, G. Franzò, V. Martorino, F. Priolo, and F. Iacona, *Defect production and annealing in ion-irradiated Si nanocrystals*, Physical Review B 65, 144109 (2002)
 54. L. Pavesi, L. Dal Negro, M. Cazzanelli, C. Mazzoleni, Z. Gaburro, F. Priolo, G. Franzò, **D. Pacifici**, A. Irrera, F. Iacona, "Towards a silicon laser," Highlights INFM (2000/2001)
 55. G. V. Prakash, N. Daldosso, E. Degoli, F. Iacona, M. Cazzanelli, Z. Gaburro, G. Pucker, P. Dalba, F. Rocca, E.C. Moreira, G. Franzò, **D. Pacifici**, F. Priolo, C. Arcangeli, A.B. Filonov, S. Ossicini, L. Pavesi, *Structural and optical properties of PECVD grown Silicon nanocrystals*, J. Nanosci. Nanotech. 1, 159 (2001)
 56. F. Priolo, G. Franzò, F. Iacona, **D. Pacifici**, V. Vinciguerra, *Excitation and non-radiative de-excitation processes in Er-doped Si nanocrystals*, Materials Science and Engineering B 81, 9 (2001)
 57. G. Franzò, E.C. Moreira, **D. Pacifici**, F. Priolo, F. Iacona, C. Spinella, *Ion Beam Synthesis of Undoped and Er-Doped Si Nanocrystals*, Nuclear Instruments and Methods in Physics Research B175-177, 140 (2001)
 58. F. Priolo, G. Franzò, **D. Pacifici**, V. Vinciguerra, F. Iacona, A. Irrera, *Role of energy transfer in the optical properties of undoped and Er-doped interacting Si nanocrystals*, Journal of Applied Physics 89, 264 (2001)
 59. G. Franzò, **D. Pacifici**, V. Vinciguerra, F. Priolo, F. Iacona, *Er³⁺ ions-Si nanocrystals interactions and their effects on the luminescence properties*, Applied Physics Letters 76, 2167 (2000)

[Research Report, ISI Web of Science® (01/09/2012):

(1) Sum of the Times Cited: **1,853**; (2) Average Citations per Item: **44.12**;

(3) h-index (Hirsch factor): **22**]

INVITED TALKS

Selected out of more than thirty oral and poster presentations:

- OPTO SPIE PHOTONICS WEST**, San Francisco, USA
Photonic and Phononic Properties of Engineered Nanostructures II 2012
 Plasmonic interferometry: a versatile tool for high-throughput biochemical sensors and energy-efficient thin-film solar cells.
- EUROPEAN OPTICAL SOCIETY (EOS)**, Capri, Italy
3rd Topical Meeting on Optical Microsystems & 1st Topical Meeting on Lasers 2009
 Applied Plasmonics: surface waves for sensing, switching and energy harvesting.
- MATERIALS RESEARCH SOCIETY**, San Francisco, CA, USA
Spring Meeting 2009
 Active Plasmonics: physics and applications.
- NANOMETA 2009, THE EUROPEAN RESEARCH SOCIETY**, Tirol, Austria
The 1st European Topical Meeting on Nanophotonics and Metamaterials 2009
 Active Plasmonic Devices: novel approaches to the generation and manipulation of surface plasmons.
- METAMATERIALS 2008**, Pamplona, Spain
2nd International Congress on Advanced Electromagnetic Materials in Microwave and Optics 2008
 Active Plasmonic Components and Metamaterials.
- PQE, PHYSICS OF QUANTUM ELECTRONICS**, Snowbird, UT, USA
The 38th Winter Colloquium on the Physics of Quantum Electronics 2008
 Plasmons in slit and hole arrays: role of coherence and short range order for modulators and solar cells.
- MATERIALS RESEARCH SOCIETY**, San Francisco, CA, USA
Spring Meeting 2004
 Rare-earth doped silicon nanostructures for Microphotonics.
- EUROPEAN MATERIALS RESEARCH SOCIETY**, Strasbourg, France
Spring Meeting 2002
 Microcavities and electroluminescent devices based on silicon nanocrystals and rare-earth doped nanocrystals.
- SOCIETÀ ITALIANA DI FISICA**, Milano, Italy
LXXXVII Congresso nazionale 2001
 Photoluminescence from silicon nanocrystals and erbium ions.

COLLOQUIA

- PRINCETON UNIVERSITY**, Princeton, NJ, USA
Department of Electrical Engineering 2009
 Plasmonics for Information, Energy and Environmental applications.
- BROWN UNIVERSITY**, Providence, RI, USA
Invited talk 2009
 Active Plasmonics for Optical Communication, Photovoltaics and Sensing Applications.
- BELL LABS**, Murray Hill, NJ, USA
Invited talk 2009
 Plasmonics: a route toward improved efficiency in thin film solar cells.
- ICFO-THE INSTITUTE OF PHOTONIC SCIENCES**, Barcelona, Spain
ICFO Colloquium 2009
 Active Plasmonics for Optical Communication, Photovoltaics and Sensing Applications.
- UNIVERSITY OF DELAWARE**, Newark, DE, USA
ECE Lecturer Series, Electrical and Computer Engineering 2008
 Active Plasmonics for Optical Communication and Photovoltaics.
- KAIST**, Daejeon, Republic of Korea
Department of Physics 2008
 Active plasmonics: ultra low-power all-optical modulators, efficient solar cells, and beyond.
- GEORGIA TECH**, Atlanta, GA, USA
School of Electrical and Computer Engineering 2008
 Active plasmonics: from ultra low-power all-optical modulators to efficient solar cells.
- BOSTON UNIVERSITY**, Boston, MA, USA
ECE Colloquium, Department of Electrical and Computer Engineering 2006
 Si-based microphotonics: light sources and plasmonic devices.

5. RESEARCH GRANTS

A. CURRENT GRANTS

2011 FOUNDATION BLANCEFLOR BONCOMPAGNI-LUDOVISI AWARD, Stockholm, Sweden.

PI: Salvatore Cosentino (Visiting Student in Pacifici's Group).

Award amount: SEK75,000. Total period covered: 9/01/11-4/30/12.

2011-2012 DORIS M. AND NORMAN T. HALPIN PRIZE FOR INTERDISCIPLINARY SENIOR CAPSTONE PROJECTS

PI: Christian Franck, Co-PI: Domenico Pacifici. Award recipient: Anastassia Astafieva

Award amount: \$750 student prize; \$2,500 research fund. Total period covered: 10/14/11-5/01/12.

B. PROPOSALS COMPLETED

2010 SALOMON AWARD, Brown University, *High-throughput, polychromatic, compact interferometric sensor array for label-free detection of chemical and biological analytes.*

PI: Domenico Pacifici.

Award amount: \$15,000. Total period covered: 1/19/10-6/30/11.

2010 US DEPARTMENT OF ENERGY, *Office of Science Financial Assistance Program*

PI: Peter Weber (Chemistry). Received support for one graduate student for one year.

Award amount: \$2,382,858. Total period covered: until 8/31/11

C. PROPOSALS SUBMITTED

DOE Early Career Award, *Quasiperiodic plasmonic concentrators for high-efficiency energy conversion in ultra-thin film solar cells*

PI: Domenico Pacifici.

Award amount: \$750,000. Total period covered: 06/01/12-01/31/17.

NSF-CBET, *Multispectral plasmonic interferometry: a new tool for high-throughput, real-time detection of cytokines*

PI: Domenico Pacifici. Co-PI: G. Tayhas R. Palmore.

Award amount: \$593,999. Total period covered: 02/01/12-01/31/15.

NSF-DMR, *Germanium nanostructures for efficient silicon-compatible optoelectronics*

PI: Domenico Pacifici. Co-PI: Alexander Zaslavsky.

Award amount: \$451,842. Total period covered: 02/01/12-01/31/15.

ENI (Ente Nazionale Idrocarburi) AWARD 2012, Renewable and Non-Conventional Energy Prize (Upon invitation)

Quasiperiodic Plasmonic Concentrators for High Efficiency Energy Conversion in Thin Film Solar Cells

PI: Domenico Pacifici.

Award amount: Euros 200,000. Total period covered: 02/01/12-01/31/15.

EPA-SBIR, *Nanophotonic devices for a miniaturized dioxin sensor*

PI: Edel Minogue (Ryon Technologies). Co-PI: Domenico Pacifici, Joseph D. Geiser

Award amount: \$26,342. Total period covered: 03/01/12-08/31/12.

RI STAC, *Nanophotonic Devices for Miniaturized Environmental Sensors*

PI: Domenico Pacifici. Co-PI: Joseph D. Geiser, Edel Minogue (Ryon Technologies)

Award amount: \$70,000. Total period covered: 01/01/12-12/31/12.

NSF-SBIR, *Plasmonic-Enhanced Rydberg Spectroscopy for Real-time Air-pollutant Monitoring*

PI: Joseph D. Geiser (Ryon Technologies). Co-PI: Domenico Pacifici, Edel Minogue

Award amount: \$50,000. Total period covered: 07/01/12-12/31/12.

6. SERVICE

A. To The UNIVERSITY

- Committee Member, Development of New Website for the School of Engineering, Brown University (2009-2011)
- Committee Member, Proposal for a new Institute for Energy Science, Brown University, Proposal Co-author (2009-2011)
- Proposal reviewer, School of Engineering, Brown University (2010).
- Instructor, Nanoscale Fabrication and Characterization Workshops, Brown University Microelectronics and Electron Microscopy Facilities, March-April 2010, Providence, RI (Organizer: Prof. R. Zia, Instructors: Prof. D. Pacifici, Prof. R. Zia, Eng. M. Jibitsky, Eng. A. McCormick)
- Graduate Research Application Screening, Brown University, School of Engineering.
- Organizer, "Electronic and Photonics" seminar series, Brown University, School of Engineering (2009-2011)
- Graduate Students Preliminary Examination, Participant. (2009-2011)
- Developed a new course, "The Physics of Solar Cells," at the undergraduate and graduate levels.
- Revamped a junior-level "Design and Fabrication of Semiconductor Devices" course with focus on semiconductor solar cell fabrication.
- Member and contributor, "Science Friday" meetings, STEM faculty group co-sponsored by the Sheridan Center for Teaching and Learning and the Science Center at Brown University.
- Run for the Faculty Executive Committee (FEC), junior faculty slate (2010)

B. To The PROFESSION

- Organizing Committee Member, Joint Fall Meeting of the New England Sections of the APS and the AAPT, Nanobiophysics in the 21st Century, October 2010, Brown University
- Program Committee Member, Photonics and Phononic Crystal Materials and Devices, OPTO SPIE Photonics West, January 2009, 2010, 2011, 2012.
- International Program Committee Member, IASTED International Conference on Solar Energy (SOE 2010, 2011), Banff, Alberta, Canada (2010, 2011)
- Selected as Local Arrangements Chair, IEEE Biennial Lester Eastman Conference on High Performance Devices, to be held at Brown University in August 2012
- Reviewer, Pilot Funding for New Research (Pfund) (2009)
- Reviewer, Science Center programs of the U.S. Department of State, U.S. Civilian Research and Development Foundation (CRDF) (2010)
- Reviewer, NSF panel evaluating photonic proposals submitted to the ECCS Division
- Reviewer, DOE Office of Science Graduate Fellowship (SCGF) Program's 2012
- Peer Reviewer for the following journals: Nature Photonics, NanoLetters, Optics Letters, Optics Express, Physical Review Letters, Applied Optics, Physical Review B, Journal of the Optical Society of America, Applied Physics Letters, Solid State Electronics.

C. To The COMMUNITY

- Speaker, Engineers Week 2010, Brown University, Talk on "Engineering of Photography" (February 2010). Showcased photographs and personal point of view in photography.
- Teaching outreach, Presented a talk on "The Power of The Sun" (with solar cell demos) at the Martin Luther King (MLK) Elementary Science Conference (June 2010), organized within the GK-12 program at Brown University. Served as judge for the Science fair at MLK.
- Organizer of guided tours and solar cell demos for elementary school students.

7. ACADEMIC HONORS & AWARDS

BROWN UNIVERSITY

Richard B. Salomon Faculty Research Award 2010

Established to support excellence in scholarly work by providing funding for selected faculty research projects deemed to be of exceptional merit.

STMICROELECTRONICS, Catania, Italy

Best Ph.D. Thesis Award 2004

Award for the best PhD thesis performed in collaboration with industry. STMicroelectronics is a global leader in developing and delivering system-on-chip and semiconductor solutions across the spectrum of microelectronics.

ACCADEMIA GIOENIA, Catania, Italy

Best Master of Science Thesis Award 2001

The Accademia Gioenia is a research society founded in 1824 that includes Italian scientists, like Nobel laureate Rita Levi Montalcini, as honorary members. The academy promotes the studies of natural phenomena in order to contribute to the progress of science.

RESEARCH DISTINCTIONS

- Paper selected for the March 28, 2011 issue of Virtual Journal of Nanoscale Science & Technology - "Plasmonic concentrators for enhanced light absorption in ultrathin film organic photovoltaics," published in Applied Physics Letters 98, 113112 (2011).
- Research achievements featured in **Nature Photonics**, "Research Highlights," vol. 3, pp. 4-5 (2009)
- Research achievements featured in **Nature Photonics**, "News & Views," vol. 1, p. 368 (2007)
- Research achievements featured in **Nature Physics**, "Research Highlights," vol. 3, p. 443 (2007)
- Article selected by **Nature Photonics** for the "First Year (2007) Highlights," (2007)
- Article featured as "Cover story" in **Nature Photonics**, vol. 1, N. 2 (2007)

8. TEACHING

ENGN 0510: Electricity and Magnetism Fall 2011

Enrollment: 127 Students.

ENGN 1970: Independent Studies in Engineering Fall 2011

Enrollment: 1 Undergraduate Student (Kaan Gunay).

ENGN 2980: Special Projects, Reading, Research and Design Fall 2011

Enrollment: 2 Graduate Students (Jing Feng, Patrick Flanigan).

PHYS 2980: Research in Physics Fall 2011

Enrollment: 2 Graduate Students (Pei Liu, Zhen Ye).

ENGN 1680: Design and Fabrication of Semiconductor Devices Spring 2011

Enrollment: 15 Students.

- ENGN 1970: Independent Studies in Engineering** Spring 2011
Enrollment: 5 Undergraduate Students (Tim Dingman, Kaan Gunay, Vihang Mehta, Aminy Ostfeld, Natalie Serrino).
- ENGN 2980: Special Projects, Reading, Research and Design** Spring 2011
Enrollment: 1 Graduate Student (Jing Feng).
- PHYS 2980: Research in Physics** Spring 2011
Enrollment: 2 Graduate Students (Pei Liu, Zhen Ye).
- ENGN 0510: Electricity and Magnetism** Fall 2010
Enrollment: 88 Students.
- ENGN 2980: Special Projects, Reading, Research and Design** Fall 2010
Enrollment: 1 Graduate Student (Jing Feng).
- PHYS 2980: Research in Physics** Fall 2010
Enrollment: 1 Graduate Student (Pei Liu).
- ENGN 1970: Independent Studies in Engineering** Fall 2010
Enrollment: 2 Undergraduate Students (Timothy Dingman, Vihang Mehta).
- ENGN 1931A: The Physics of Solar Cells** Spring 2010
Enrollment: 13 Students.
- ENGN 0510: Electricity and Magnetism** Fall 2009
Enrollment: 112 Students.

- Currently, advisor of four graduate students (Pei Liu, Jing Feng, Patrick Flanigan and Son T. Le, the latter co-advised with Prof. A. Zaslavsky) and six undergraduate students (Alec Roelke, Stephen Palazola, Kaan Gunay, Matthew Breuer, Abigail Plummer, and Anastassia Astafieva, co-advised with Prof. Christian Franck). Also research supervisor for a graduate student (Vince Siu) from Prof. G. Tayhas R. Palmore's group.

Graduate student supervision:

1. Pei Liu, Ph.D. in Physics (2010-present)
2. Jing Feng, Ph.D. in Electrical Engineering (2010-present)
3. Patrick Flanigan, Ph.D. in Electrical Engineering (2011-present)
4. Son T. Le, Ph.D. in Physics, co-advised with Prof. Alexander Zaslavsky (2010-present)
5. Zhen Ye, Ph.D. in Physics (2011)
6. Vince Siu, Ph.D in Biomedical Engineering, co-advised with Prof. G. Tayhas R. Palmore (2010-present)

Undergraduate honor thesis supervision:

1. Alec Roelke, Computer Engineering (2009-present)
2. Aminy Ostfeld, Electrical Engineering (2009-2011)
3. Tim Dingman, Engineering-Physics (2010-2011)

Undergraduate Teaching and Research Awards (UTRA):

1. Alec Roelke, 2011 Summer UTRA
2. Stephen Palazola, 2011 Summer UTRA
3. Aminy Ostfeld, 2010 Summer UTRA
4. Natalie Serrino, 2010 Fall UTRA

Other Undergraduate Awards:

1. Anastassia Astafieva, 2011-2012 Doris M. and Norman T. Halpin Prize for Interdisciplinary Senior Capstone Projects