

## DEIRDRE M. O'CARROLL

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### EDUCATION

- 2002-2008      *PhD*, Microelectronic Engineering  
Nanotechnology Group, Tyndall National Institute  
Dept. of Electrical & Electronic Engineering, University College Cork, Ireland
- 1998-2002      *B. E.*, Electrical Engineering (*First-Class Honours*)  
Dept. of Electrical & Electronic Engineering, University College Cork, Ireland

### APPOINTMENTS

- 02/2023-present      Interim Board Director, PhotonicsNJ
- 07/2022-present      Graduate Program Director  
Department of Materials Science and Engineering, Rutgers University
- 06/2022-present      Associate Editor, ACS Applied Optical Materials  
American Chemical Society
- 04/2022-present      Co-Director, NSF REU Site: Advanced Materials at Rutgers Engineering
- 07/2017-present      Associate Professor (with tenure), Rutgers University  
Department of Materials Science and Engineering (51%)  
Department of Chemistry and Chemical Biology (49%)
- 05/2018-09/2019      SFI Investigator (part-time), Trinity College Dublin  
School of Physics and CRANN
- 01/2011-06/2017      Assistant Professor, Rutgers University  
Department of Materials Science and Engineering (51%)  
Department of Chemistry and Chemical Biology (49%)  
Institute for Advanced Materials, Devices and Nanotechnology (IAMDN)
- 01/2010-12/2010      Marie Curie Postdoctoral Research Fellow (return phase)  
University of Strasbourg and CNRS, Strasbourg, France  
Advisor: Prof. Thomas W. Ebbesen
- 11/2007-12/2009      Postdoctoral Research Scholar and Marie Curie Postdoctoral Research Fellow  
(outgoing phase) in Materials Science and Applied Physics,  
California Institute of Technology, Pasadena, CA, USA.  
Project: *Active Organic Surface Plasmon Enhanced Nanophotonic Devices*. Advisor:  
Prof. Harry A. Atwater
- 08/2002-11/2007      Graduate Researcher in the Nanotechnology Group at Tyndall National Institute and  
Dept. of Electrical and Electronic Engineering (previously Microelectronics),  
University College Cork, Cork, Ireland.  
Thesis: *Conjugated Polymer Nanowires: One-Dimensional Structures and Devices for  
Nanophotonics*. Advisor: Prof. Gareth Redmond
- 05/2001-08/2001      Digital Circuit Design Engineer,  
Cypress Semiconductor Design Center, Ireland.  
Project: *Design of Analogue to Digital Converters for Bluetooth Technologies*.

### AWARDS AND RECOGNITIONS

- 2023      Rutgers' Innovation Ventures, TechAdvance Award
- 2023      Finalist, 2023 Equalize Pitch Competition

2019	Rutgers' Research Council Award
2018	SFI FRL Investigator Award
2017	ACS Polymer Materials Science and Engineering (PMSE) Young Investigator
2016	NSF CAREER Award
2013	Selected as Rutgers' nominee for the Packard Foundation Fellowship
2012	Rutgers' Research Council Award
2008-2010	EC Marie Curie International Fellowship
2008	1 <sup>st</sup> place, Tyndall Best Paper Competition
2007	1 <sup>st</sup> place, Inaugural Tyndall Postgraduate Poster Competition
2002-2005	IRCSET NSOM Postgraduate Research Scholarship

## RESEARCH INTERESTS

- *Nanoscale Photonics for Organic Optoelectronics*: Plasmonic metasurface electrodes for OPV and OLEDs; nanostructured organic light-emitting devices; surface plasmon enhanced bulk-heterojunction photovoltaics; green photonics; life-cycle engineering and design of organic optoelectronics.
- *Photonic Nanostructures*: polymer nanolasers; optical nanoantennas; sub-wavelength conjugated polymer waveguides; analytical and computational electromagnetic theory of nanostructures.
- *Conjugated Polymer Materials*: excitonic energy migration, Förster resonance energy transfer, spontaneous emission rate modification; polymer chain orientation and alignment under nanoscale confinement.
- *Nanofabrication*: Large-area and low-process-energy nanofabrication methods (templating, de-alloying, de-wetting, nanoimprint lithography); solution-based synthesis of semiconductor/metal nanoparticle hybrids.

## SCHOLARSHIP

### LIST OF PUBLICATIONS

*Summary*: 76 peer-reviewed journal and conference publications (43 as corresponding author, 16 as first author); 1 book chapter, 2 issued patents. Citations: 2766; H-index: 28 (Google Scholar: <https://scholar.google.com/citations?user=T97GxukAAAAJ&hl=en>).

### Book Chapters

**D. M. O'Carroll**, "Organic Photonic Nanostructures". Chapter 4 of *Handbook of Organic Materials for Electronic and Photonic Devices*, 111-138 (2019).

### Peer-Reviewed Journal Publications

(<sup>†</sup>graduate student advisee; <sup>‡</sup>undergraduate or high-school student advisee; \*corresponding author)

67. N. Javed<sup>†\*</sup>, H. Pacheco<sup>†</sup>, S. Sreekumar<sup>†</sup>, J. Chong<sup>†</sup>, Z. Cheng<sup>†</sup>, **D. M. O'Carroll**<sup>\*</sup>, High Solid-State Photoluminescence Quantum Yield of Carbon-Dot-Derived Molecular Fluorophores for Light-Emitting Devices. Manuscript submitted.
66. R. Leil<sup>‡</sup>, M. Mahrous, N. Javed<sup>†</sup>, S. Sreekumar<sup>†</sup>, H. Pacheco<sup>†</sup>, N. Tarek, **D. O'Carroll**, N. Allam<sup>\*</sup>, Untapped potential of scrap brass alloy: A new frontier in the use of brass-based photocathodes for stable and durable photoelectrochemical water splitting. Manuscript submitted.
65. C. Kumah<sup>†</sup>, Z. Cheng<sup>†</sup>, N. Javed<sup>†</sup>, **D. M. O'Carroll**<sup>\*</sup>, Enhancements to Charge Transfer State Emission on Plasmonic Surfaces. Manuscript under revision following peer review in the journal J. Mater. Chem. C.
64. K. L. House<sup>†</sup>, K. H. Christian, T. J. Emge, H. Pacheco<sup>†</sup>, R. A. Haber, **D. M. O'Carroll**<sup>\*</sup>, Characterization of Nanoscale Morphology and Mechanical Properties of Conjugated Polymer Thin Films Prepared Through Antisolvent Dripping. Manuscript under revision following peer-review in the journal Polymer.
63. Z. Cheng<sup>†</sup>, N. Javed<sup>†</sup>, F. Zhao, **D. M. O'Carroll**<sup>\*</sup>, Photon Recycling in Organic Semiconductor Films Using Plasmonic Metasurfaces. *Materials Today Physics*, in press.

62. C. M. Carter<sup>†</sup>, K. M. Gwynne<sup>††</sup>, R. Leil<sup>‡</sup>, Z. Shen<sup>†</sup>, Z. Cheng<sup>†</sup>, N. Javed<sup>†</sup>, C. Kumah<sup>†</sup>, E. Bethur<sup>‡</sup>, D. Santa<sup>‡</sup>, C. D. Wang<sup>†</sup>, **D. M. O'Carroll\***, Photostability of blue phosphorescent films on plasmonic surfaces. *The Journal of Chemical Physics* 158, 174704 (2023).
61. N. Javed<sup>†</sup>, Z. Cheng<sup>†</sup>, K. Zhu, R. Crichton, H. Maddali<sup>†</sup>, G. Hall, J. Zhang, J. Li, **D. M. O'Carroll\***, Carbon Dot-like Molecular Nanoparticles, Their Photophysical Properties, and Implications for LEDs. *ACS Applied Nano Materials* 5, 11741-11751 (2022).
60. S. Sreekumar<sup>†</sup>, M. Heidari, Z. Cheng<sup>†</sup>, H. Maddali<sup>†</sup>, K. House<sup>†</sup>, H. Frei, E. Galoppini\*, **D. M. O'Carroll\***, Self-Assembled Monolayers for Improved Charge Injection of Silver Back Electrodes in Inverted Organic Electronic Devices. *ACS Applied Materials & Interfaces* 14, 38270-38280 (2022).
59. K. L. House<sup>†</sup>, L. Pan, **D. M. O'Carroll**, S. Xu\*, Applications of scanning electron microscopy and focused ion beam milling in dental research. *European Journal of Oral Sciences* 130, e12853 (2022).
58. K. L. House<sup>†</sup>, Z. Hao, Y. Liu, L. Pan, **D. M. O'Carroll**, S. Xu\*, The integrity of synthetic magnesium silicate in charged compounds. *Scientific Reports* 11, 23717 (2021).
57. H. Maddali<sup>†</sup>, A. M. Tyryshkin, **D. M. O'Carroll\***, Dual-Mode Polymer-Based Temperature Sensor by Dedoping of Electrochemically Doped, Conjugated Polymer Thin Films. *ACS Applied Electronic Materials* 3, 4718-4725 (2021).
56. Z. Cheng<sup>†</sup>, **D. M. O'Carroll\***, Photon Recycling in Semiconductor Thin Films and Devices. *Advanced Science* 8, 2004076 (2021), [review](#).
55. K. Zhu, Z. Cheng<sup>†</sup>, S. Rangan, M. Cotlet, J. Du, L. Kasaei, S. J. Teat, W. Liu, Y. Chen, L. C. Feldman, **D. M. O'Carroll**, J. Li\*, A New Type of Hybrid Copper Iodide as Nontoxic and Ultrastable LED Emissive Layer Material. *ACS Energy Letters* 6, 2565-2574 (2021).
54. N. Javed<sup>†</sup>, **D. M. O'Carroll\***, Carbon Dots and Stability of their Optical Properties. *Particle and Particle Systems Characterization* 38, 2000271 (2021), [review](#).
53. H. Maddali<sup>†</sup>, C. E. Miles, J. Kohn, **D. M. O'Carroll\***, Optical Biosensors for Virus Detection: Prospects for SARS-CoV-2/COVID-19, *ChemBioChem* 22, 1176-1189 (2021), [review](#).
52. N. Javed<sup>†</sup>, **D. M. O'Carroll\*** Long-term effects of impurities on the particle size and optical emission of carbon dots. *Nanoscale Advances* 3, 182-189 (2021). *Highlighted on the front cover*.
51. F. McGrath<sup>†</sup>, J. Qian, K. Gwynne<sup>†</sup>, C. Kumah<sup>†</sup>, D. Daly, C. Hrelescu, X. Zhang, **D. M. O'Carroll\***, A. L. Bradley\*, Structural, optical, and electrical properties of silver gratings prepared by nanoimprint lithography of nanoparticle ink. *Applied Surface Science* 537, 147892 (2021).
50. C. E. Petoukhoff\*, K. M. Dani, **D. M. O'Carroll\***, Strong Plasmon-Exciton Coupling in Ag Nanoparticle-Conjugated Polymer Core-Shell Hybrid Nanostructures. *Polymers* 12, 2141 (2020).
49. Z. Shen<sup>†</sup>, Z. Cheng<sup>†</sup>, J. I. Tracey<sup>†</sup>, C. E. Kumah<sup>†</sup>, **D. M. O'Carroll\***, Modification of Luminescence from Dual-Emission Molecules by Plasmonic Surfaces, *The Journal of Physical Chemistry C* 124, 17218-17226 (2020).
48. Z. Cheng<sup>†</sup>, N. Javed<sup>†</sup>, **D. M. O'Carroll\***, Optical and Electrical Properties of Organic Semiconductor Thin Films on Aperiodic Plasmonic Metasurfaces. *ACS Applied Materials & Interfaces* 12, 35579-35587 (2020).
47. H. Maddali<sup>†</sup>, K. L. House<sup>†</sup>, T. J. Emge, **D. M. O'Carroll\***, Identification of the local electrical properties of crystalline and amorphous domains in electrochemically doped conjugated polymer thin films. *RSC Advances* 10, 21454-21463 (2020).
46. W. Lustig, Z. Shen<sup>†</sup>, S. Teat, N. Javed<sup>†</sup>, E. Velasco, **D. M. O'Carroll**, J. Li\*, Rational Design of a High-

Efficiency, Multivariate Metal-Organic Framework Phosphor for White LEDs. *Chemical Science* 11, 1814-1824 (2020).

45. X. Hei, W. Liu, K. Zhu, S. Teat, S. Jensen, M. Li, **D. M. O'Carroll**, K. Wei, K. Tan, M. Cotlet, T. Thonhauser, J. Li\*, Blending ionic and coordinate bonds in hybrid semiconductor materials: A general approach toward robust and solution-processable covalent/coordinate network structures. *Journal of the American Chemical Society* 142, 4242-4253 (2020).
44. Z. Cheng<sup>†</sup>, Y. Wang, **D. M. O'Carroll**\*, Influence of Partially-Oxidized Silver Back Electrodes on the Electrical Properties and Stability of Organic Semiconductor Diodes. *Organic Electronics* 70, 179-185 (2019).
43. J. I. Tracey<sup>†</sup>, S. Aziz<sup>‡</sup>, **D. M. O'Carroll**\*, Investigation of the role of polyol molecular weight in the polyol synthesis of silver nanoparticles. *Materials Research Express* 6, 115067 (2019).
42. Y. Fang, C. A. Sojda, G. Dey, S. Teat, M. Li, M. Cotlet, K. Zhu, W. Liu, L. Wang, **D. M. O'Carroll**, J. Li\*, Highly Efficient and Very Robust Blue-Excitable Yellow Phosphors Built on Multiple-Stranded One-Dimensional Inorganic-Organic Hybrid Chains. *Chemical Science* 10, 5363-5372 (2019).
41. X. Wang, J. Jian, S. Diaz-Amaya, C. E. Kumah<sup>†,‡</sup>, P. Lu, J. Huang, D. Gen Lim, V. G. Pol, J. P. Youngblood, A. Boltasseva, L. A. Stanciu, **D. M. O'Carroll**, X. Zhang, H. Wang\*, Hybrid plasmonic Au–TiN vertically aligned nanocomposites: a nanoscale platform towards tunable optical sensing. *Nanoscale Advances* 1, 1045-1054 (2019).
40. J. Tracey<sup>†</sup>, **D. M. O'Carroll**\*, Short-Wavelength Lasing-Spasing and Random Spasing with Deeply Subwavelength Thin-Film Gain Media. *Advanced Functional Materials* 28, 1802630 (2018).
39. Z. Shen<sup>†</sup>, K. Zhu, **D. M. O'Carroll**\*, Aperiodic Porous Metasurface-Mediated Organic Semiconductor Fluorescence. *ACS Photonics* 5, 1215-1227 (2018).
38. B. Yu<sup>†</sup>, M. Vacha, **D. M. O'Carroll**\*, Plasmonic Sphere-on-Plane Systems with Semiconducting Polymer Spacer Layers. *Physical Chemistry Chemical Physics* 20, 11749-11757 (2018).
37. B. Agyei-Tuffour<sup>†</sup>, N. Y. Doumon, E. R. Rwenyagila, J. Asare, O. K. Oyewole, Z. Shen<sup>†</sup>, C. E. Petoukhoff<sup>†</sup>, M. G. Zebaze Kana, **D. M. O'Carroll**, W. O. Soboyejo, "Pressure Effects on Interfacial Surface Contacts and Performance of Organic Solar Cells." *Journal of Applied Physics* 122, 205501 (2017).
36. W. Liu, K. Zhu, S. J. Teat, G. Dey, Z. Shen<sup>†</sup>, L. Wang, **D. M. O'Carroll**, J. Li\*, "All-in-One: Achieving Robust, Strongly Luminescent and Highly Dispersible Hybrid Materials by Combining Ionic and Coordinate Bonds in Molecular Crystals." *Journal of the American Chemical Society* 139, 9281-9290 (2017).
35. Y. Fang, W. Liu, S. J. Teat, G. Dey, Z. Shen<sup>†</sup>, L. An, D. Yu, L. Wang, **D. M. O'Carroll**, J. Li\*, "A Systematic Approach to Achieving High Performance Hybrid Lighting Phosphors with Excellent Thermal- and Photostability." *Advanced Functional Materials* 27, 1603444 (2017).
34. Y. Wang, R. Fullon, M. Acerce, C. E. Petoukhoff<sup>†</sup>, J. Yang, C. Chen, S. Du, S. K. Lai, S. P. Lau, D. Voiry, **D. O'Carroll**, G. Gupta, A. D. Mohite, S. Zhang, H. Zhou\*, M. Chhowalla\*, "Solution-Processed MoS<sub>2</sub>/Organolead Trihalide Perovskite Photodetectors." *Advanced Materials* 29, 1603665 (2017).
33. A. K. Dalsania<sup>‡</sup>, J. Kohl<sup>†</sup>, C. Kumah<sup>†,‡</sup>, Z. Shen<sup>†</sup>, C. E. Petoukhoff<sup>†</sup>, C. M. Carter<sup>†</sup>, **D. M. O'Carroll**\*, "Effects of Metal Film Thickness and Gain on the Coupling of Organic Semiconductor Emission to Surface Plasmon Polaritons." *Journal of Materials Chemistry C* 4, 10111-10119 (2016).
32. C. E. Petoukhoff,<sup>†,\*</sup> M. B. M. Krishna, D. Voiry, I. Bozkurt, S. Deckoff-Jones, M. Chhowalla, **D. M. O'Carroll**, K. M. Dani, "Ultrafast Charge Transfer and Enhanced Absorption in MoS<sub>2</sub> - Organic van der Waals Heterojunctions using Plasmonic Metasurfaces." *ACS Nano* 10, 9899-9908 (2016).

31. C. M. Carter<sup>†</sup>, J. Cho<sup>‡</sup>, A. Glanzer<sup>‡</sup>, N. Kamcev<sup>‡</sup>, **D. M. O'Carroll\***, "Cost, Energy and Emissions Assessment of Organic Polymer Light-Emitting Device Architectures." *Journal of Cleaner Production* 137, 1418-1431 (2016).
30. G. Z. Cheung<sup>‡</sup>, B. Yu<sup>†</sup>, M. Liu, Z. Gong, J. Kohl<sup>†</sup>, C. E. Petoukhoff<sup>†</sup>, P. Piotrowiak, **D. M. O'Carroll\***, "Effects of Conjugated Polymer Incorporation on the Morphology and Energy Harvesting of Solution-Processed Phthalocyanine-Based Thin-Films." *Synthetic Metals* 220, 469-476 (2016).
29. C. E. Petoukhoff<sup>†,\*</sup>, C. Antonick<sup>‡</sup>, K. M. Dani, **D. M. O'Carroll**, Oxidation of Planar and Plasmonic Ag Surfaces by Exposure to O<sub>2</sub>/Ar Plasma for Organic Optoelectronic Applications. *MRS Advances* 1, 943-948 (2016).
28. B. Agyei-Tuffour<sup>†</sup>, E. R. Rwenyagila, J. Asare, O. K. Oyewole, M. G. Zebaze Kana, **D. M. O'Carroll**, W. O. Soboyejo, Influence of Pressure on Contacts between Layers in Organic Photovoltaic Cells. *Advanced Materials Research* 1132, 204-216 (2016).
27. Z. H. Kafafi<sup>\*</sup>, A. F. Nogueira, R. J. Martín-Palma, **D. M. O'Carroll**, J. J. Pietron, I. D.W. Samuel, F. So, N. Tansu, L. Tsakalagos, The Role of Photonics in Energy. *Journal of Photonics for Energy* 5, 050997-1-44 (2015), [review](#).
26. C. E. Petoukhoff<sup>†</sup>, **D. M. O'Carroll\***, Absorption-Induced Scattering and Surface Plasmon Out-Coupling from Absorber-Coated Plasmonic Metasurfaces. *Nature Communications* 6, 7899-1-13 (2015).
25. B. Yu<sup>†</sup>, J. Woo<sup>‡</sup>, M. Kong<sup>‡</sup>, **D. M. O'Carroll\***, Mode-Specific Study of Nanoparticle-Mediated Optical Interactions in an Absorber/Metal Thin Film System. *Nanoscale*, 7, 13196-13206 (2015).
24. Z. Shen<sup>†</sup>, **D. M. O'Carroll\***, Nanoporous Silver Thin Films: Multifunctional Platforms for Influencing Chain Morphology and Optical Properties of Conjugated Polymers. *Advanced Functional Materials* 25, 3302-3313 (2015).
23. A. Wade, P. Lovera, **D. O'Carroll**, H. Doyle, G. Redmond<sup>\*</sup>, Luminescent Optical Detection of Volatile Electron Deficient Compounds by Conjugated Polymer Nanofibers. *Analytical Chemistry* 87, 4421-4428 (2015).
22. C. E. Petoukhoff<sup>†</sup>, Z. Shen<sup>†</sup>, M. Jain<sup>‡</sup>, A. Chang<sup>‡</sup>, **D. M. O'Carroll\***, Plasmonic Electrodes for Bulk-Heterojunction Organic Photovoltaics: A Review. *Journal of Photonics for Energy* 5, 057002-1-28 (2015), [review](#).
21. R. Thomas<sup>\*</sup>, L. Fabris, **D. M. O'Carroll**, Gold Nanowire and Nanorod Plasmonic Mechanisms for Increasing Ultra-Thin Organic Photovoltaic Active Layer Absorption. *Plasmonics* 9, 1283-1301 (2014).
20. J. Kohl<sup>†</sup>, J. A. Pantina, **D. M. O'Carroll\***, Enhancing Surface Plasmon Leakage at the Metal/Semiconductor Interface: Towards Increased Light Outcoupling Efficiency in Organic Optoelectronics. *Optics Express*, 22, 7644-7656 (2014).
19. C. E. Petoukhoff<sup>†</sup>, D. K. Vijapurapu<sup>‡</sup>, **D. M. O'Carroll\***, Computational Comparison of Conventional and Inverted Organic Photovoltaic Performance Parameters with Varying Metal Electrode Surface Workfunction. *Solar Energy Materials and Solar Cells* 120, 572-583 (2014).
18. C. T. Nemes<sup>‡</sup>, D. K. Vijapurapu<sup>‡</sup>, C. E. Petoukhoff<sup>†</sup>, G. Z. Cheung<sup>‡</sup>, **D. M. O'Carroll\***, Size and Substrate Dependence of Absorption and Scattering by Silver Nanoparticles with Conjugated Polymer Thin Film Coatings. *Journal of Nanoparticle Research* 15:1801 (2013).
17. **D. M. O'Carroll\***, C. E. Petoukhoff<sup>†</sup>, J. Kohl<sup>†</sup>, B. Yu<sup>†</sup>, C. Carter<sup>†</sup>, S. Goodman<sup>‡</sup>, Conjugated Polymer-Based Photonic Nanostructures. *Polymer Chemistry* 4, 5181-5196 (2013), [review](#).

16. B. Yu<sup>†</sup>, S. Goodman<sup>‡</sup>, A. Abdelaziz<sup>‡</sup>, **D. M. O'Carroll**<sup>\*</sup>, Light-Management in Ultra-Thin Polythiophene using Plasmonic Monopole Nanoantennas. *Applied Physics Letters* 101, 151106 (2012).
15. **D. M. O'Carroll**<sup>\*</sup>, J. Fakonas, D. M. Callahan, M. Schierhorn, H. A. Atwater, Metal-Polymer-Metal Split-Dipole Nanoantennas. *Advanced Materials* 24, OP136-OP142 (2012).
14. J. Kohl<sup>†</sup>, M. Fireman<sup>‡</sup>, **D. M. O'Carroll**<sup>\*</sup>, Surface Plasmon and Photonic Mode Propagation in Gold Nanotubes with Varying Wall Thickness. *Physical Review B* 84, 235118 (2011).
13. J. A. Hutchison, **D. M. O'Carroll**<sup>\*</sup>, T. Schwartz, C. Genet, T. W. Ebbesen<sup>\*</sup>, Absorption Induced Transparency. *Angewandte Chemie International Edition* 50, 2085-2089 (2011).
12. **D. M. O'Carroll**<sup>\*</sup>, C. E. Hofmann, Harry A. Atwater, Conjugated Polymer/Metal Nanowire Heterostructure Plasmonic Antennas. *Advanced Materials* 22, 1223-1227 (2010).
11. **D. O'Carroll**<sup>\*</sup>, D. Iacopino, G. Redmond<sup>\*</sup>, Luminescent Conjugated Polymer Nanowire Y-Junctions with On-Branch Molecular Anisotropy. *Advanced Materials* 21, 1160-1165 (2009).
10. **D. O'Carroll**<sup>\*</sup>, G. Redmond<sup>\*</sup>, Highly Anisotropic Luminescence from Poly(9,9-dioctylfluorene) Nanowires Doped with Orientationally Ordered  $\beta$ -phase Polymer Chains. *Chemistry of Materials* 20, 6501-6508 (2008).
9. S. Moynihan, P. Lovera, **D. O'Carroll**<sup>\*</sup>, D. Iacopino, G. Redmond<sup>\*</sup>, Alignment and Dynamic Manipulation of Conjugated Polymer Nanowires in Nematic Liquid Crystal Hosts. *Advanced Materials* 20, 2497-2502 (2008).
8. S. Moynihan, D. Iacopino, **D. O'Carroll**<sup>\*</sup>, P. Lovera, G. Redmond<sup>\*</sup>, Template Synthesis of Highly Oriented Polyfluorene Nanotube Arrays. *Chemistry of Materials* 20, 996-1003 (2008).
7. **D. O'Carroll**<sup>\*</sup>, J. Irwin, D. Tanner, G. Redmond<sup>\*</sup>, Polyfluorene Nanowires with Pronounced Axial Texturing Prepared by Melt Assisted Template Processing. *Materials Science and Engineering: B* 147, 298-302 (2008).
6. **D. O'Carroll**<sup>\*</sup>, G. Redmond<sup>\*</sup>, Polyfluorene Nanowire Active Waveguides as Sub-Wavelength Polarized Light Sources. *Physica E* 40 (7), 2468-2473 (2008).
5. **D. O'Carroll**<sup>\*</sup>, D. Iacopino, A. O'Riordan, P. Lovera, É. O'Connor, G. A. O'Brien, G. Redmond<sup>\*</sup>, Poly(9,9-dioctylfluorene) Nanowires with Pronounced  $\beta$ -Phase Morphology: Synthesis, Characterization and Optical Properties. *Advanced Materials* 20, 42-48, (2008).
4. S. Moynihan, D. Iacopino, **D. O'Carroll**<sup>\*</sup>, H. Doyle, D. A. Tanner, G. Redmond<sup>\*</sup>, Emission Colour Tuning in Semiconducting Polymer Nanotubes by Energy Transfer to Organo-Lanthanide Dopants. *Advanced Materials* 19, 2474-2479 (2007).
3. **D. O'Carroll**<sup>\*</sup>, I. Lieberwirth, G. Redmond<sup>\*</sup>, Melt Processed Polyfluorene Nanowires as Active Waveguides. *Small* 3, 1178 (2007).
2. **D. O'Carroll**<sup>\*</sup>, I. Lieberwirth, G. Redmond<sup>\*</sup>, Microcavity Effects and Optically Pumped Lasing in Single Conjugated Polymer Nanowires. *Nature Nanotechnology* 2, 180 (2007).
1. C. Barrett, D. Iacopino, **D. O'Carroll**<sup>\*</sup>, G. De Marzi, D. A. Tanner, A. J. Quinn, G. Redmond<sup>\*</sup>, Synthesis of Pentacene Nanotubes by Melt-Assisted Template Wetting. *Chemistry of Materials* 19, 338 (2007).

**Peer-Reviewed Conference Proceedings Papers (extended papers listed only)**

9. D. Man<sup>‡</sup>, M. Oliveira<sup>‡</sup>, N. Guntupalli<sup>‡</sup>, R. Sikand<sup>‡</sup>, Y. Wykoff<sup>‡</sup>, H. Pacheco<sup>†</sup>, **D. O'Carroll**<sup>\*</sup>, Application of Nanoimprint Lithography to Conducting Polymers for Infrared Photonics. *IEEE Digital Explore*, in press.

8. Z. Cheng<sup>†</sup>, **D. M. O'Carroll\***, Optical and Electrical Properties of Plasmonic Electrodes for Inverted Fabrication of Organic Semiconductor Devices. *47<sup>th</sup> IEEE PVSC Proceedings* 0603-0605 (2020).
7. **D. M. O'Carroll\***, C. E. Petoukhoff<sup>†</sup>, Z. Cheng<sup>†</sup>, Z. Shen<sup>†</sup>, C. M. Carter<sup>†</sup>, Native-Metal-Oxide-Coated Plasmonic Electrode Metasurfaces for Nanophotonic Light Trapping and Efficient Charge Collection. *44<sup>th</sup> IEEE PVSC Proceedings* 3393-3395 (2017).
6. **D. M. O'Carroll\***, C. E. Petoukhoff<sup>†</sup>, Influence of Organic Active Layer Morphology on Plasmonic Light-Trapping. *43<sup>rd</sup> IEEE PVSC Proceedings* 1072-1074 (2016).
5. S. Goodman<sup>‡</sup>, **D. M. O'Carroll\***, Plasmonic mode interactions with organic semiconductor gain media in nano-confined geometries. *Proceedings of the SPIE* 9181, 91810Q-1-11 (2014).
4. **D. M. O'Carroll\***, Light Management for Conjugated Polymer-Based Photovoltaics. *39<sup>th</sup> IEEE PVSC Proceedings* 2742-2745 (2013).
3. **D. M. O'Carroll\***, A. X. Collopy, V. E. Ferry, H. A. Atwater, Surface Plasmon Assisted Absorption in Conjugated Polymer Thin Films and Devices. *25<sup>th</sup> EU PVSEC / WCPEC-5 Proceedings* 834-837 (2010).
2. **D. O'Carroll**, A. O'Riordan, G. Redmond\*, Polarized Luminescence from Single Polymer Nanowires and Aligned Nanowire Arrays. *MRS Proceeding* 948, B09-04 (2007).
1. **D. O'Carroll**, G. Redmond\*, Waveguiding, Microcavity Effects and Optically Pumped Lasing in Single Melt Processed Polyfluorene Nanowires. *MRS Proceedings* 965, S03-05 (2007).

#### Patents and Inventions

3. **Notice of Invention:** "Method to Convert Polypropylene into Carbon-based Luminescent Materials." Y. Yang<sup>†</sup>, D. M. O'Carroll, RU Docket #2024-015 (2023).
2. **Issued patent:** "Phosphorescent emitters and extrinsic method for increasing stability thereof." D. M. O'Carroll, US 10,693,098 (2020).
1. **Issued patent:** "Organic optoelectronic devices incorporating plasmonic electrodes." D. M. O'Carroll, C. E. Petoukhoff<sup>†</sup>, D. K. Vijapurapu<sup>‡</sup>, US 9,263,689B2 (2016).

#### Journal Covers and Press

- "Rutgers is Part of NSF-Funded Consortium to Advance Photonics Research and Workforce Development," Rutgers Research Communications, Summer Edition (2023).
- Front Cover: *ACS Applied Materials and Interfaces*, Issue 33-34 (2022)
- Front Cover: *Nanoscale Advances*, Issue 1 (2021)
- Frontispiece: *Advanced Functional Materials* (2018)
- Featured on the front cover of *RU Engineering Inaugural Magazine* (Spring 2016)
- Inside Back Cover: *Advanced Functional Materials*, Vol. 25 (2015)
- Back Cover Highlight: *Nanoscale*, Vol. 7 (2015).
- "Gold Nanoantennas Boost the Emission Rate of Conjugated Polymers," *Materials Views*, June 7 (2012).
- "Polymer Photonics: A Template for Lasers," *Nature Photonics, Research Highlights*, 1, 202, April (2007).
- "Image in Focus: Optically pumped single polymer nanowire laser" *Materials* 360 1, March (2007).
- "Nanotechnology: Thin Blue Line" *Nature, Research Highlights* 446, 5, March (2007).
- Cover: *Nature Nanotechnology*, Vol. 2 (2007).
- "Nanowire Lasers Go Organic" *Nature Nanotechnology* Vol. 2, 141, March (2007).

## PRESENTATIONS

### Invited/Keynote Conference Presentations, Seminars and Colloquia (Selected)

47. "The Impacts of Plasmonics on the Efficiency and Stability of Organic Optoelectronic Materials and Devices." *University of Rochester*, Institute of Optics and Department of Chemistry joint seminar, Rochester, NY. (February 17<sup>th</sup>, 2020).
46. "Modifications to the Efficiency and Stability of Polymer-Based Optoelectronic Materials using Plasmonic Nanostructures." *Rutgers University*, Department of Chemistry and Chemical Biology, Physical Chemistry Seminar, Piscataway, NJ. (November 1st, 2019).
45. "Exciton-Plasmon Interactions in Thin Films and Metasurfaces." *Duke University*, Department of Mechanical Engineering and Materials Science, Durham, NC. (October 16<sup>th</sup>, 2019).
44. "Influence of Exciton-Plasmon Interactions on Light Trapping and Light Extraction from Organic Semiconductor Thin Films." *Peking University*, College of Chemistry and Molecular Engineering, Beijing, China (September 28<sup>th</sup>, 2019).
43. "Plasmonic Metasurface Electrodes for Light Management in Excitonic Solar Cells." *Northwestern University*, Center for Light Energy Activated Redox Processes (LEAP) Symposium, Evanston, IL (April 26<sup>th</sup>, 2019).
42. "Exciton-Plasmon Coupling at Plasmonic Surfaces and Implications for Thin-Film Optoelectronics." *MRS Spring Conference 2019*, Phoenix, AZ (April 25<sup>th</sup>, 2019).
41. "Metasurfaces For Thin Film Optoelectronics." *Trinity College Dublin*, School of Physics Seminar, Dublin, Ireland (March 15<sup>th</sup>, 2019).
40. "Plasmonic Metasurface Electrodes for Excitonic Solar Cells." *65<sup>th</sup> AVS International Symposium*, Long Beach, CA. October 23<sup>rd</sup>, 2019.
39. "Metasurfaces for Improved Efficiency and Stability of Thin-Film Optoelectronic Devices." *The 2<sup>nd</sup> Annual Energy Harvesting Society Meeting, Penn. State*. At The Navy Yard, Philadelphia, PA (September 6<sup>th</sup>, 2018).
38. "Metasurfaces for Light Management in Semiconductor Thin Films." (Keynote) *IEEE Nano 2018, 18<sup>th</sup> IEEE International Conference on Nanotechnology*, Cork, Ireland. (July 26<sup>th</sup>, 2018).
37. "Influence of Aperiodic Plasmonic Metasurfaces on Exciton-Plasmon Coupling and Thin-Film Light Management." *Brookhaven National Laboratory, NSLS-II & CFN Users' Meeting 2018*, Upton, NY (May 22<sup>nd</sup>, 2018).
36. "Impacts of Thin-Film Morphology and Exciton-Nanostructure Coupling and on the Optoelectronic Performance of Conjugated Organic Materials." *Millersville University*, Chemistry Department Seminar, Millersville, PA (September 11<sup>th</sup>, 2017).
35. "Influence of Conjugated Polymer Thin-Film Morphology and Exciton-Plasmon Coupling on Nanophotonic Light Trapping and Light Extraction." *253<sup>rd</sup> American Chemical Society (ACS) National Meeting, 2017 Spring Meeting, PMSE Young Investigator Symposium*, San Francisco, CA (April 2017).
34. "Exciton-plasmon coupling in organic-semiconductor-coated silver nanoparticles." *Stevens Institute of Technology*, Department of Chemical Engineering and Materials Science Seminar, Hoboken, New Jersey (October 2016).



33. "Nanophotonic interactions between organic excitons and plasmonic metasurfaces."  
*META 2016, 7<sup>th</sup> International Conference on Metamaterials, Photonic Crystals and Plasmonics*, Malaga, Spain (July 2016).
32. "Light management in thin-film organic optoelectronic devices for energy efficiency and energy harvesting applications."  
*ACS 44<sup>th</sup> Middle Atlantic Regional Meeting (MARM 2016)*, Riverdale, New York (June 2016).
31. "Exciton Interactions with Plasmonic Metasurfaces for Thin-Film Energy Conversion Applications."  
*Trinity College Dublin*, Physics Department Seminar (April 2016).
30. "Nanophotonic Interactions Between Organic Excitons and Plasmonic Metasurfaces."  
*American Physical Society (APS)*, 2016 Spring Meeting, Baltimore, Maryland (March 2016).
29. "Nanophotonic Interactions Between Organic Excitons and Plasmonic Metasurfaces."  
*Lehman College*, Chemistry Department Seminar (March 2016).
28. "Metal-Polymer Interactions at the Nanoscale for Energy Efficiency and Energy Harvesting Applications."  
*Koya University*, 3<sup>rd</sup> ICC Workshop, Japan (January 2016).
27. "Plasmonic Electrodes for Organic Optoelectronics."  
*MRS Spring 2015*, San Francisco, CA (April 2015).
26. "Influence of Plasmonic Electrodes on the Optical and Morphological Properties of Organic Semiconductor Thin Films."  
*Rutgers University*, Laboratory for Surface Modification (LSM) Seminar (January 2015).
25. "Disordered Plasmonic Electrodes for Thin-Film Optoelectronics."  
*University of Maryland, College Park*, Materials Science and Engineering Seminar (November 2014).
24. "Effects of Plasmonic Electrodes on the Optical and Morphological Properties of Conjugated Polymer Thin-Films."  
*Binghamton University, SUNY*, Dept. of Physics, Applied Physics & Astronomy Colloquium (Nov. 2014).
23. "Plasmonic Mode Amplification using Organic Semiconductor Gain Media."  
*SPIE Optics + Photonics*, San Diego, CA, Light Manipulating Organic Materials and Devices (August 2014).
22. "Plasmonic Mode Amplification Using Organic Semiconductor Gain Media in Nano-Confined Geometries."  
*MRS Spring 2014*, San Francisco, CA, Symposium KK: Resonant Optics - Fundamentals and Applications (April 2014).
21. "Nanophotonic for Optoelectronic Energy Efficiency and Generation."  
*Tokyo Institute of Technology*, International Collaboration in Chemistry Workshop (March 2014).
20. "Light management approaches in nanostructured organic semiconductor thin films." ‘  
*SPIE Optics + Photonics*, San Diego, CA, Organic Photovoltaics XIV, Session 5: Novel Approaches and Architectures II (August 2013).
19. "Surface Plasmons in Next-Generation Conjugated Polymer Optoelectronics: A Help or a Hindrance?"  
*William Patterson University*, Chemistry Department Seminar (March 2013).
18. "Identification of Design Rules for the Application of Plasmonic Nanostructures to Organic Polymer Optoelectronics."  
*Wright-Patterson Air-Force Base*, Dayton, Ohio (November 2012).
17. "Designing Plasmonic Structures for Improved Light-Matter Interactions in Conjugated Polymer Materials."  
*Rutgers-Newark*, Chemistry Department Seminar (September 2012).

16. "Surface Plasmon Enhanced Excitonic Processes in Nanostructured Semiconducting Polymer Materials."  
*XI International Conference on Nanostructured Materials, Nano 2012*, Rhodes, Greece (August 2012).
15. "Surface Plasmon-Conjugated Polymer Interactions."  
*International Conference on Science and Technology of Synthetic Metals, ICSM 2012* (July 2012).
14. "Nanophotonics and Plasmonics for Organic Optoelectronic Devices."  
*Corning Inc.*, Corning, New York (April 2012).
13. "Nanoscale Conjugated Polymer Photonic Devices."  
*University of Delaware*, Department of Chemistry and Biochemistry Seminar (April 2012).
12. "Resonant Optical Antenna Effects in Organic Opto-Electronic Devices."  
*SPIE Optics + Photonics* (8115: Organic Light Emitting Materials and Devices XV), San Diego, CA, USA (August 2011).
11. "Nanoscale Conjugated Polymer Light-Emitting and Light-Harvesting Photonic Devices: Nanowire Lasers, Waveguides and Antennas."  
*Rutgers University*, Materials Science and Engineering Graduate Symposium (April 2011)
10. "Metal/Semiconductor Optical Antenna Heterostructures."  
*Rutgers University*, Laboratory for Surface Modification (LSM) Twenty-Fifth Annual Symposium (March 2011).
9. "Nanoscale Conjugated Polymer Light-Emitting and Light-Harvesting Photonic Devices: Nanowire Lasers, Waveguides and Antennas."  
*Princeton University*, Chemical and Biological Engineering Dept. Seminar (February 2011).
8. "Plasmonic Nanoantennas for Organic Optoelectronics: Surface Plasmon-Assisted Light-Emitting and Light Harvesting Devices."  
*Rutgers University*, NSF-IGERT Nanotechnology for Clean Energy, 1<sup>st</sup> Annual Symposium (September 2010).
7. "Nanostructured Organic Optoelectronic Devices."  
*Rutgers University*, Chemistry and Chemical Biology Department Seminar (June 2010).
6. "Nanostructured Organic Optoelectronic Devices."  
*Rutgers University*, Materials Science and Engineering Department Seminar (April 2010).
5. "Coupling Between Semiconductor Quantum Dots and Plasmonic Cavities, Antennas and Waveguides."  
*MRS Fall 2010*, Boston, USA. Invited oral presentation given on behalf of H. A. Atwater due to scheduling conflict. (December 2010).
4. "Linear Plasmonic Antennas Coupled to Conjugated Polymer Nanoemitters."  
*U. California, Berkeley*, Elec. Eng. Dept., Photonics and Plasmonics Seminar Series (May 2009).
3. "Polymer Nanowire Lasers and Antennas for Nanophotonics."  
*Caltech*, Kavli Nanoscience Institute (KNI) and the Microdevices Laboratory (MDL) JPL Joint Monthly Seminar Series (April 2009).
2. "Conjugated Polymer Nanowires: One-Dimensional Structures and Devices for Nanophotonics."  
*University of Strasbourg*, Strasbourg, France (January 2008).
1. "Polymer Nanowires for Sub-Wavelength Photonics."  
*Photonics Ireland 2007 Conference*, Galway, Ireland (September 2007).

## RESEARCH GRANTS

- 08/23-01/25 National Science Foundation (TI-2314068),  
Partnership For Innovation - Technology Translations (PFI-TT)  
Project Title: *PFI-TT Development of Blue Phosphorescent OLEDs with Improved Lifetime and Efficiency using Plasmonic Electrodes for Portable Displays.*  
Role: PI. Amount: \$250,000
- 06/23-06/24 TechAdvance (internal)  
Project Title: *Development of Stable and Efficient Blue Organic Light-Emitting Diodes (OLEDs).*  
Role: PI. Amount: \$74,602
- 06/22-05/24 National Science Foundation (TI-2227381)  
Project Title: *I-Corps: Stable and Efficient Organic Light-Emitting Diodes (OLEDs) for Applications in Horticulture and Architectural Lighting.*  
Role: PI. Amount: \$50,000
- 04/22-04/25 National Science Foundation, REU Site  
Project Title: *REU Site: Advanced Materials at Rutgers Engineering.*  
Role: Co-PI (PI is Dr. Meenakshi Dutt). Amount: \$382,260 (O'Carroll's share: \$191,130)
- 05/22-06/23 Core Facilities Award: Nion UltraSTEM (internal)  
Role: PI (sole). Amount: \$5,000
- 06/22-05/23 Rutgers Global (internal)  
Project Title: *Chiral Metasurfaces for Enhanced Valleytronics using 2-Dimensional Materials*  
Role: PI (sole). Amount: \$7,960
- 07/20-07/21 National Science Foundation (ECCS-1608389)  
Project Title: *US-Ireland Research and Development Partnership: Spin and valley interactions in intrinsic and magnetic two-dimensional transition metal dichalcogenides for novel devices.*  
Role: Senior Personnel/Funded Collaborator (PI is Dr. Richard Lehman). Amount: \$360,000 (O'Carroll's share: \$200,000)
- 06/16-05/22 National Science Foundation, CAREER grant award (DMR-1554954).  
Project Title: *CAREER: Nanophotonic Radiative Decay Rate Engineering for Stable Blue Organic Phosphorescence.*  
Role: PI (sole). Amount: \$490,380
- 07/19-06/21 Rutgers' Research Council Grant Award (internal).  
Project Title: *Photon Recycling in All-Polymer Photovoltaic Materials*  
Role: PI (sole). Amount: \$3,000.
- 05/18-09/19 Science Foundation Ireland, Future Research Leaders Award  
Project Title: *Green Photonics*  
Role: PI (sole). Amount: € 233,891
- 9/14-8/18 National Science Foundation, International Collaboration in Chemistry (ICC) grant award (CHE-1415881).  
Project Title: *International Collaboration in Chemistry: Electronic and Vibrational Dynamics of Molecules and Polymers in Close Proximity to Nanostructured Metal Surfaces and Arrays.*  
Role: Co-PI (PI is Dr. Piotr Piotrowiak). Amount: \$510,000 (O'Carroll's share: \$137,836)
- 07/16-06/17 Rutgers' IAMDN Small Instrumentation Grant (internal)  
Title: *Dual Time-Resolved Electroluminescence and Photoluminescence Measurement Instrumentation*  
Role: PI (sole). Amount: \$12,500
- 7/13-6/17 National Science Foundation, EPM grant award (DMR-1309459).

- Project Title: *Theoretical and Experimental Design of Multifunctional Plasmonic Electrodes for Polymer-Based Optoelectronics*.  
Role: PI (sole). Amount: \$335,926
- 3/13-12/13 UES Inc./AFOSR grant.  
*Project Title: Plasmonic Nanorods for Organic Photovoltaic Devices: Theory and Experiment*.  
Role: Co-PI (PI is Dr. Laura Fabris). Amount: \$90,000 (O'Carroll's share: \$45,000).
- 7/12-5/13 Rutgers' Research Council Grant Award (internal).  
*Project Title: On-Chip Communication of Visible Light Using Nanoscale Antennas*.  
Role: PI (sole); Amount: \$4,783.
- 2008-2010 Marie Curie International Outgoing Fellowship (European Commission).  
*Project Title: Active Organic Surface Plasmon Enhanced Nanophotonic Devices*.  
Amount; €200,042
- 2002-2005 IRCSET NSOM Postgraduate Research Scholarship (Irish Research Council)  
Project: Near-field optical microscopy of conjugated polymer thin films and nanostructures.  
Amount: €57,000.

## **TEACHING AND MENTORING**

### **RESEARCH ADVISEES**

*Summary:* 18 graduate advisees (10 PhDs graduated since 2011; 6 current PhD student advisees; 2 current/former Masters student advisees); 2 postdoctoral advisees; 3 international visiting graduate advisees; 52+ undergraduate/high-school research advisees. Served/serving on more than 40 PhD thesis committees (in addition to my PhD advisees).

#### **Graduate and Postdoctoral Research Advisees**

1. Yongqi Yang (09/2022 - present): PhD graduate student, CCB (TA)
2. Deah Hamza (06/2022 - present): PhD graduate student, MSE (part-time)
3. Jinyu Chong (12/2020 - present): PhD graduate student, CCB (TA)
4. Haydee Pacheco (10/2020 - present): PhD graduate student, MSE (GA)
5. Sneha Sreekumar (10/2019 - present): PhD graduate student, CCB (TA, First Year Fellowship).
6. Cindy Kumah (09/2016 - present): PhD Candidate, MSE (GA, SOE Fellowship, First Year Fellow).
7. Sumant Wasule (09/2019 - 05/2021): Masters graduate student.
8. Dr. Nasir Javed (04/2017 - 12/2022): PhD graduate Student, MSE (Fulbright Scholar).  
*Defended PhD in December 2022*
9. Dr. Krystal House (03/2019 - 12/2021): PhD graduate student, CCB (Colgate Fellow, TA).  
*Defended PhD in December 2021*
10. Dr. Hemanth Maddali (09/2016 - 09/2021): PhD graduate student, CCB (GA, TA).  
*Defended PhD in September 2021*
11. Dr. Zhongkai Cheng (09/2016 - 09/2021): PhD graduate student, CCB (GA, TA).  
*Defended PhD in September 2021*
12. Kelsey Gwynne (11/2017 - 05/2020): Masters graduate student, MSE (TA; First Year Fellow).
13. Fionnuala McGrath (08/2018 - 09/2019): PhD co-advisee and visiting researcher from Trinity College Dublin.
14. Dr. Chenguang Wang (08/2018 - 09/2019): Postdoctoral researcher, Trinity College Dublin.
15. Dr. Jill Tracey (09/2014 - 06/2019): Graduate student, CCB (GA/TA; GAANN Fellow (2016-2017)).  
*Defended PhD in June 2019.*
16. Dr. Zeqing Shen (09/2012 - 12/2017): Graduate student, CCB (GA/TA).  
*Defended PhD in December 2017.*
17. Dr. Catrice Carter (09/2012 - 12/2017): Graduate student, MSE (GA/TA; GAANN Fellow (2013 - 2015); Corning Fellow, 2012 - 2013).  
*Defended PhD in December 2017.*
18. Dr. Christopher E. Petoukhoff (09/2011 - 12/2016): Graduate student, MSE (GA; NSF-IGERT Fellow 2012 - 2015; Corning Fellow, 2011-2012).  
*Defended PhD in December 2016.*
19. Dr. Binxing Yu (09/2011 - 06/2016): Graduate student, CCB (TA/GA).

*Defended PhD in June 2016.*

20. Katsuya Noji (11/2015 - 02/2016): Visiting Graduate Researcher from Tokyo Institute of Technology.
21. Benjamin AgyeiTuffour (09/2013 - 07/2014): Visiting Graduate Researcher from the University of Ghana.
22. Dr. Jesse Kohl (03/2011 - 05/2014): Graduate student, MSE (NSF-IGERT Fellow 2011-2014).

*Defended PhD in May 2014.*

23. Dr. Roney Thomas (03/2013 - 03/2014), postdoctoral researcher, Rutgers.

### **Undergraduate/High School Research Student Research Advisees**

1. Keely McCabe (01/2021 – 05/2022): Rutgers, MSE Undergraduate Research Assistant (Senior Lab.)
2. Dante Thomas (06/2020 – 08/2020): Rutgers, CCB, LSAMP Undergraduate Research Assistant
3. Jordan Andrews (06/2020 – 08/2020): RiSE Summer Undergraduate Research Assistant
4. Eshana Bethur (01/2019 – 05/2020): Rutgers, MSE Undergraduate Research Assistant (Senior Lab.)
5. Vandana Gollarhalli (10/2018 – 05/2020): Rutgers, MSE Undergraduate Research Assistant (Senior Lab.)
6. Rahma A. Leil (01/2017 – 05/2020): Rutgers, MSE Undergraduate Research Assistant (Project SUPER; Senior Lab.)
7. Ruike Lyu (09/2019 - 12/2019): Jilin University Intern, CCB
8. Dana Yun (06/2019 - 08/2019): U. Illinois (Urbana-Champaign), REU Advanced Materials
9. Xin Zhang (09/2018 - 12/2018): Jilin University Intern, CCB
10. Trystan Irmiere (06/2018 - 08/2018): TCNJ, REU Advanced Materials
11. Radhe Bangad (01/2018 - 05/2019): Rutgers, MSE Undergraduate RA (Aresty & Project SUPER)
12. Joshua Kuras (01/2018 - 08/2019): Rutgers, MSE Undergraduate Research Assistant
13. Yi Yang (09/2017 - 12/2017): Jilin University Intern, CCB
14. Maria L. Adrover (06/2017 - 08/2017): U. Puerto Rico, REU Advanced Materials
15. Daniel Um (01/2017 - 05/2018): Rutgers, MSE Undergraduate Research Assistant
16. Kristina Laya (10/2016 - 05/2017): Rutgers, MSE Undergraduate Research Assistant
17. Yutong Wu (9/2016 - 12/2016): Jilin University Intern, CCB
18. Anand Patel (01/2016 - 05/2017): Rutgers, MSE Undergraduate Research Assistant
19. Seerat Aziz (01/2016 - 09/2016): Rutgers, MSE Undergraduate Research Assistant
20. Kelsey Gwynne (06/2016 - 08/2016): Wagner College (Rutgers RiSE Undergraduate Researcher)
21. Zhongkai Cheng (09/2015 - 12/2015): Jilin University Intern, CCB
22. Maria Ramos Sepulveda (06/2015 - 08/2015): U. Puerto Rico (REU GET-UP Undergraduate Researcher)
23. Maxine Siss (02/2015 - 05/2016): Rutgers, MSE Undergraduate Research Assistant
24. Ankur Dalsania (09/2014 - 05/2017): Rutgers, CCB Undergraduate Research Assistant (Aresty Researcher)
25. Catherine Antonick (09/2014 - 05/2016): Rutgers, MSE Undergraduate Research Assistant
26. AiMei Chang (09/2013 - 05/2015): Rutgers, MSE Undergraduate Research Assistant
27. Joe Woo (06/2013 - 05/2015): Rutgers, MSE Undergraduate Research Assistant
28. Yingge (Betty) Cong (09/14 - 12/14): Jilin University Intern, CCB Undergraduate Research Assistant
29. Cindy Kumah (06/2014 - 07/2014): U. Maryland, Baltimore County (REU GET-UP Undergrad. Researcher)
30. Nikola Kamcev (06/2014): GSET Summer High School Research Assistant
31. Justin Cho (06/2014): GSET Summer High School Research Assistant
32. Aaron Glanzer (06/2014): GSET Summer High School Research Assistant
33. Peter Spatocco (02/2014 - 12/2014): Rutgers, MSE Undergraduate Research Assistant
34. Pragi Siva (06/2013 - 12/2014): Rutgers, MSE Undergraduate Research Assistant (Aresty Research Fellow)
35. Manika Jain (06/2012 - 01/2015): Rutgers, MSE Undergraduate Research Assistant
36. Gary Cheung (05/2011 - 08/2014): Rutgers, MSE Undergrad. Research Assistant (Aresty Research Fellow)
37. Divya Vijapurapu (06/2011 - 07/2014): Rutgers, MSE Undergraduate Research Assistant
38. Sarah Goodman (09/2011 - 08/2014): Rutgers, CCB Undergrad. Research Assist. (Aresty Research Fellow)
39. Michael Kong (06/2013 - 09/2013): Rutgers, MSE Undergraduate Research Assistant
40. Owen Abe (06/2013 - 08/2013): U. Maryland, Baltimore County (Rutgers RiSE Undergraduate Researcher)
41. Emily Esposito (09/2012 - 05/2013): Rutgers, CCB Undergraduate Research Assistant
42. Kevin Savage (09/2012 - 05/2013): Civil Engineering (Aresty Research Assistant)
43. Xiaojun Wang (09/12 - 12/12): Jilin University Intern, CCB, Undergraduate Research Assistant
44. Avni Mehta (Summer 2012): Biotechnology High School, Freehold, NJ
45. Coleen Nemes (Summer 2012): Marist College (Rutgers RiSE Undergraduate Researcher)
46. Joshua Vichare (01/2012 - 05/2012): Rutgers, MSE Undergraduate Research Assistant
47. Alexa Abdelaziz (06/2011 - 05/2013): Rutgers, MSE Undergraduate Research Assistant
48. Kenan Gebizlioglu (Summer 2011): Rutgers, MSE Undergraduate Research Assistant

49. Cherylyn Geers (Summer 2009): Intern from Institute for Educational Advancement at Caltech.
50. Arianne Collopy (Summer 2009): Caltech summer undergraduate research fellow (SURF).
51. Micha Fireman (2008 - 2009): Caltech SURF and Senior Year Applied Physics undergraduate researcher.
52. Jennifer Irwin (2005 - 2006): Undergraduate Senior Year Chemistry student.

## **COURSES TAUGHT**

*Summary:* Lecturer and course instructor/coordinator for 7 different undergraduate-level courses and 5 different graduate-level courses at Rutgers University from Fall 2011 to present.

### 01:160:351: Inorganic Chemistry 1

Fall 2023, Fall 2022. Lecturer and course co-instructor for this undergraduate course in the Department of Chemistry and Chemical Biology at Rutgers University; 3 credits. O'Carroll teaches the first 14 classes, Greenblatt teaches the second 14 classes.

### 16:635:505: Advanced Optical Materials

Fall 2023, Fall 2022, Fall 2021, Fall 2020, Fall 2018: Lecturer and course instructor for this graduate course in Department of Materials Science and Engineering at Rutgers University; 3 credits.

### 01:160:492:03: Seminar in Chemistry

Spring 2023. Course instructor for this undergraduate seminar course in the Department of Chemistry and Chemical Biology at Rutgers University; 1 credit.

### 01:160:353: Inorganic Chemistry 3

Spring 2022. Lecturer and course instructor for this undergraduate course in the Department of Chemistry and Chemical Biology at Rutgers University; 1.5 credits.

### 01:160:361: Chemical Bonding

Spring 2020, Spring 2019, Fall 2017, Spring 2017: Lecturer and course instructor for this undergraduate-level course in the Department of Chemistry and Chemical Biology at Rutgers University; 1.5 credits.

### 14:635:433: Optical Materials

Fall 2017, Fall 2016, Fall 2015, Fall 2014, Fall 2013: Lecturer and course instructor for a this senior undergraduate course in the Department of Materials Science and Engineering at Rutgers University; 3 credits.

### Materials Seminar

Fall 2023, Spring 2023, Fall 2022, Fall 2017: Co-ordinator and instructor for this graduate-level seminar series in the Department of Materials Science and Engineering at Rutgers University; 1 credit.

### 01.160.329: Experimental Physical Chemistry

Spring 2015, Spring 2014: Co-taught this undergraduate laboratory course in the Department of Chemistry and Chemical Biology at Rutgers University; 2.5 credits.

### Guest lecturer: Photonic, Electronic and Magnetic Applications of Nanostructures

Fall 2015, Fall 2013: Senior undergraduate course in the Department of Materials Science and Engineering at Rutgers University taught by Manish Chhowalla.

### 16:160:541/01:160:191: Instrumental Analysis and Materials Characterization

Summer 2014, Summer 2013: Graduate course offered by IAMDN at Rutgers University; taught two to three classes on Optical Spectroscopy per summer.

### 16:160:577: Solid State Chemistry

Spring 2012: Graduate-level course in the Department of Chemistry and Chemical Biology at Rutgers University; 3 credits.

### 16:635:604: Devices for Energy Storage, Harvesting and Conversion

Spring 2012: Joint-course coordinator and lecturer for this graduate-level course for Rutgers-Princeton Nanotechnology for Clean Energy NSF-IGERT Program; 3 credits.

14.635.322: Photonic, Electronic and Magnetic Applications of Nanostructures

Fall 2012, Fall 2011: Senior undergraduate course in the Department of Materials Science and Engineering at Rutgers University; 3 credits.

## SERVICE

### **INTERNAL UNIVERSITY SERVICE**

2020 - present: SOE Dean's Faculty Working Group  
2019 - present: CCB Quantum Faculty Search Committee  
2015 - present: School of Engineering Health and Safety Committee  
2014 - present: MSE Department Advisory Committee  
2013 - present: MSE Department Safety Officer  
2012 - present: Rutgers RiSE/REU Faculty Mentor  
2018 - 2019: Member, MSE Faculty Search Committee  
2016 - 2017: Member, Task Force on Materials Science and Engineering  
2017 - 2018: Member, MSE/Physics Microscopy Faculty Search Committee  
2017: School of Engineering Commencement Marshall  
2014 - 2018: Rutgers University Laboratory Safety and Design Committee  
2015 - 2019: Judge, MGM Symposium Poster Awards  
2015 - 2016: Member, CCB Department Graduate Admissions Committee  
2011 - 2016: Mentor, Rutgers Aresty Undergraduate Research Program  
2015: Member, CCB Faculty Search Committee, Physical Chemistry  
2015: Organizer, MSE Department's Rutgers Day Activities  
2012, 2015, 2019: MSE Laboratory Tours  
2013 - 2015: Reviewer, NJ Governor's School of Engineering and Technology (GSET) applications.  
2011 - 2015: Faculty advisor, NSF-IGERT "Nanotechnology for Clean Energy"  
2014: Freshman Orientation Lecture for MSE  
2013 - 2015: Faculty advisor, MRS Student Chapter  
2012 - 2014: Member, CCB Department Graduate Admissions Committee  
2014: Member, CCB Department Website Committee  
2013: Member, School of Engineering Student Disciplinary Committee  
2011, 2013: MSE Department Marshall at Engineering Commencement  
2011: Member, CCB Department Demonstration Committee

### **EXTERNAL SERVICE**

#### **Peer Review for Journals and Organizations (alphabetical order)**

ACS Nano (4); ACS Photonics (4); Advanced Energy Materials; Advanced Optical Materials (2); Advanced Materials (4); Advanced Materials Interfaces; Angewandte Chemie; Applied Materials Today; Applied Physics A; Applied Surface Science (4); Chemistry: A European Journal; Energy and Environmental Science; IEEE Transactions on Nanotechnology (2); Journal of Applied Physics (2); Journal of Chemical Physics (3); Journal of Experimental Nanoscience (2); Journal of Materials Science; Journal of Nanoparticle Research; Journal of Photonics for Energy (4); Journal of Physical Chemistry; Light: Science & Applications (2); Materials in Electronics; Materials Science and Engineering B; Nano Letters (4); Nanoscale (3); Optical Materials; Optics Express; Physics of Plasmas (4); Science Advances; Scientific Reports (3); SPIE Press.

Publons Peer Review Summary: <https://publons.com/researcher/1392999/deirdre-ocarroll/peer-review/>

#### **Peer Review of Proposals**

ACS Petroleum Research Fund

European Research Council Starting Grants Program  
French National Research Agency (ANR)  
German Research Foundation  
U. S. Department of Energy (1 panel; 1 mail review)  
U. S. National Science Foundation (13 panels; 2 mail reviews)

### **Journal Editing**

06/2022 - present: Associate Editor, ACS Applied Optical Materials (ACS).  
07/2019 - present: Member of the Editorial Board, APL Photonics (AIP).  
04/2013 - present: Associate Editor for the Journal of Photonics for Energy (SPIE).  
2015: Guest editor for the Journal of Photonics for a Special Section on Nanophotonics and Plasmonics for Solar Energy Harvesting and Conversion

### **Other External Activities and Contributions**

2017 - present: Member, MRS postdoctoral award committee  
2015, 2016, 2017: Session Chair, MRS Fall Graduate Award Symposium, Boston, MA  
2014, 2016: Reviewer, IEEE-PVSC Conference abstracts (x2)  
Spring 2014; Fall 2015: Judge, MRS Graduate Student Awards (x2)  
2013: Session chair, SPIE Optics and Photonics 2013 Conference, San Diego, CA  
2013: Session chair, MRS Spring 2013 Conference, San Francisco, CA  
2012: Judge, SPIE Poster Awards  
2012: Session Chair, Nano 2012 Conference, Rhodes, Greece, August 2012  
2012: Session Chair, ICSM 2012 Conference, Atlanta, GA  
2009: Member, interview committee for SURF program applicants, Caltech

=====*End of O'Carroll CV*=====