

Michael J. Naughton

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Education Boston University, Ph.D. Physics 1986
St. John Fisher College, B.S. Physics 1979

Professional

Ferris Professor Boston College, 09/2008 – present
Chairman Department of Physics, Boston College, 11/2006 – present
CTO Solasta Inc., Newton, MA, 2006 – 2010
Assoc. VP Research Boston College, interim: 08/2005 – 11/2006
Professor Department of Physics, Boston College, 1998 – present
Professor Department of Physics, State University of New York at Buffalo, 1998
Visiting Scientist National High Magnetic Field Laboratory, Tallahassee, Florida, 1996
Visiting Scientist Service National de Champs Magnetique Pulses, Toulouse, France 1995
Associate Professor Department of Chemistry, State University of New York at Buffalo, 1993
Associate Professor Department of Physics, State University of New York at Buffalo, 1993
Assistant Professor Department of Physics, State University of New York at Buffalo, 1988
Post-Doc Department of Physics, University of Pennsylvania, 1986-1988

Thesis and Post-Doc Advisors

James S. Brooks (Ph.D.) and Paul M. Chaikin (post-doc)

Honors & Awards

Young Investigator Award, National Science Foundation, 1992
Fellow, American Physical Society, 2003
Distinguished Research Award, Boston College, 2005
Nanotech Briefs, Nano⁵⁰, 2006
Ignite Clean Energy, MIT Enterprise Forum (2nd place), 2006
Karl Herzfeld Memorial Lecturer, Catholic University, 2011

Professional Activities

Member, American Physical Society, American Chemical Society, Materials Research Society,
Society for Neuroscience
Founder, Solasta Inc.
Founder, Tau Sensors LLC
Executive Committee, American Physical Society, Division of Condensed Matter Physics, 1998-2002
Chairman, inaugural National High Magnetic Field Laboratory Users' Committee, 1995-1998
Organizer, American Physical Society New England Section Annual Meeting, *Energy Matters*, 2014
Organizer, Near-field Nanophotonics Workshop, Boston College, 2014
Member, External Academic Review Committee, University of Vermont Department of Physics, 2014
Member, Review Committee, Research Core in Interdisciplinary Science, Okayama University, 2012-2014
Participant, Ignatian Colleagues Program, 2012-2014
Proposal Reviewer, National Science Foundation, Dept. of Energy, National Institutes of Health
Member, Scientific Advisory Board, Bloo Solar, Sacramento, CA
Member, Scientific Advisory Board, NBD Nanotechnologies, Boston, MA

Publications

Updated December, 2016

(H-Index: 43, i10-index: 93, citations: ~6,100, 211 publications, including 22 issued patents)

Links to PubMed [here](#).

Under Review

- *Nanocrystalline silicon thin films with europium dopants for photovoltaic applications*, M.J. Naughton, Y. Yakymenko, V. Koval, I. Baryakhtar, M.J. Burns, Y. Yasievich, A. Ivashchuk, S. Voloshko, S. Sidorenko and A. Oleshkevich
- *From Airy to Abbe: A parametric study of the focusing of scalar spherical waves*, Yitzi M. Calm, Juan M. Merlo, Michael J. Burns and Michael J. Naughton

Published

1. *Wireless communication system via nanoscale plasmonic antennas*, Juan M. Merlo, Nathan T. Nesbitt, Yitzi M. Calm, Aaron H. Rose, Luke D'Imperio, Chaobin Yang, Michael J. Burns, Krzysztof Kempa and Michael J. Naughton, *Scientific Reports* **6**, 31710 (2016).
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2. *Shielded coaxial optrode arrays for neurophysiology*, J.R. Naughton, J. Varela, M.J. Burns, T.C. Chiles, J.P. Christianson and M. J. Naughton, *Frontiers in Neuroscience* **10**, 252 (2016).
[doi:10.3389/fnins.2016.00252](https://doi.org/10.3389/fnins.2016.00252)
3. *Effects of geometry on drift-limited solar cells*, T. Kirkpatrick, M.J. Burns and M.J. Naughton, *Physica Status Solidi B* **253** (8), 1653–1659 (2016).
[doi:10.1002/pssb.201552412](https://doi.org/10.1002/pssb.201552412)
4. *Roadmap on optical energy conversion*, S. Boriskina, M.A. Green, K. Catchpole, E. Yablonovitch, M.C. Beard, Y. Okada, S. Lany, T. Gershon, A. Zakutayev, M. Tahersima, V.J. Sorger, M.J. Naughton, K. Kempa, M. Dagenais, Y. Yao, L. Xu, X. Sheng, N.D. Bronstein, J.A. Rogers, A.P. Alivisatos R.G. Nuzzo, J.M. Gordon, D.M. Wu, M.D. Wisser, A. Salleo, J., Dionne, P. Bermel, J.-J. Greffet, I. Celanovic, M. Soljacic, A. Manor, C. Rotschild, A. Raman, L. Zhu, S. Fan, G. Chen, *Journal of Optics* **18**, 073004 (2016).
[doi:10.1088/2040-8978/18/7/073004](https://doi.org/10.1088/2040-8978/18/7/073004)
5. *Aluminum nanowire arrays via directed assembly*, N. Nesbitt, J.M. Merlo and M.J. Naughton, *Nano Letters* **15**, 7294-7299 (2015).
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6. *Toward a hot electron plasmonic solar cell*, J. Kong, A. H. Rose, C. Yang, J. M. Merlo, M. J. Burns, M. J. Naughton, and K. Kempa, *Optics Express* **23** (19), A1087-A1095 (2015).
[doi:10.1364/OE.23.0A1087](https://doi.org/10.1364/OE.23.0A1087)
7. *A nanocoaxial-based electrochemical sensor for the detection of cholera toxin*, M.M. Archibald, B. Rizal, M. Rossi, T. Connolly, M.J. Burns, M.J. Naughton and T.C. Chiles, *Biosensors and Bioelectronics* **74**, 406-410 (2015).
[doi:10.1016/j.bios.2015.06.069](https://doi.org/10.1016/j.bios.2015.06.069) PMID: 26164012
8. *Spectroscopic evidence for negative compressibility of a quasi-three-dimensional spin-orbit correlated electron system*, J. He, T. Hogan, T.R. Mion, H. Hafiz, Y. He, S.-K. Mo, C. Dhital, X. Chen, Q. Lin, Y. Zhang, M. Hashimoto, H. Pan, D.H. Lu, M. Arita, K. Shimada, R.S. Markiewicz, Z. Wang, K. Kempa, M.J. Naughton, A. Bansil, S.D. Wilson and R-H. He, *Nature Materials* **14**, 577-582 (2015).
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9. *Analytical device physics framework for non-planar solar cells*, T. Kirkpatrick, M.J. Burns and M.J. Naughton, *Solar Energy Materials and Solar Cells* **133**, 229-239 (2015).
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10. *Embedded metal nanopatterns as a general scheme for enhanced broadband light absorption*, F. Ye, M.J. Burns and M.J. Naughton, *Physica Status Solidi (A)* **212**, 561-565 (2015).
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11. *Stress-induced growth of aluminum nanowires with a range of cross-sections*, F. Ye, M.J. Burns, G. McMahon, S. Shepard and M.J. Naughton, *Physica Status Solidi (A)* **212**, 566-572 (2015).
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12. *Nanocoaxes for optical and electronic devices* (Invited Critical Review), B. Rizal, J.M. Merlo, M.J. Burns, T.C. Chiles and M.J. Naughton, *Analyst* **140**, 39-58 (2015). (JOURNAL COVER).
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13. *Structured metal thin film as an asymmetric color filter: the forward and reverse plasmonic halos*, F. Ye, M.J. Burns and M.J. Naughton, *Scientific Reports* **4**, 7267 (2014) (5 pp).
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14. *Leakage radiation microscope for observation of non-transparent samples*, J.M. Merlo, F. Ye, M.J. Burns and M.J. Naughton, *Optics Express* **22**, 22895-22904 (2014). Selected by the Optical Society of America Editors for Virtual Journal for Biomedical Optics (VJBO).
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15. *Symmetry-broken metamaterial absorbers as reflectionless directional couplers for surface plasmon polaritons in the visible range*, F. Ye, M.J. Burns and M.J. Naughton, *Advanced Optical Materials* **2**, 957-965 (2014). (JOURNAL FRONTISPIECE).
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16. *Near-field observation of light propagation in nanocoax waveguides*, J.M. Merlo, B. Rizal, Fan Ye, M.J. Burns and M.J. Naughton, *Optics Express* **22**, 14148-54 (2014).
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17. *Nanoscope based on nanowaveguides*, A.H. Rose, B.M. Wirth, R.E. Hatem, A.P. Rashed Ahmed, M.J. Burns, M.J. Naughton and K. Kempa, *Optics Express* **22**, 5228-5233 (2014).
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18. *Optical and electrical mappings of surface plasmon cavity modes* (Invited Review), F. Ye, J. M. Merlo, M.J. Burns and M.J. Naughton, *Nanophotonics* **3**, 33-49 (2014).
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19. *Angular magnetoresistance oscillations in the quasi-one dimensional conductor (DMET)₂I₃*, P. Dhakal and M.J. Naughton, Annual Journal of Central Department of Physics AJCDP2014, Tribhuvan University, Kirtipur, Nepal (2014).
20. *Nanocoax-based electrochemical sensor*, B. Rizal, M.M. Archibald, T. Connolly, S. Shepard, M.J. Burns, T.C. Chiles and M.J. Naughton, *Analytical Chemistry* **85**, 10040-10044 (2013).
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21. *Plasmonic halos: Optical surface plasmon circular drumhead modes*, F. Ye, M.J. Burns and M.J. Naughton, *Nano Letters* **13**, 519-523 (2013).
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22. *Imprint-templated nanocoaxial array architecture*, B. Rizal, F. Ye, P. Dhakal, T.C. Chiles, S. Shepard, G. McMahon, M.J. Burns and M.J. Naughton, in "Nano-Optics for Enhancing Light-Matter Interactions on a Molecular Scale", NATO Science for Peace and Security Series B: Physics and Biophysics, Vol. XIX, pp 359-372 (2013).
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23. *Embedded metal nanopatterns for near-field scattering-enhanced optical absorption*, F. Ye, M.J. Burns and M.J. Naughton, *Physica Status Solidi (A)* **209**, 1829-1834 (2012). (JOURNAL COVER).
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24. *Angular magnetoresistance effects in the molecular organic conductor (DMET)₂I₃*, P. Dhakal, H. Yoshino, J-I. Oh, K. Kikuchi and M.J. Naughton, *Synthetic Metals* **162**, 1381-1385 (2012) (JOURNAL COVER).
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25. *Ultrasensitive chemical detection using a nanocoax sensor*, H. Zhao, B. Rizal, G. McMahon, H. Wang, P. Dhakal, T. Kirkpatrick, Z. Ren, T.C. Chiles, M.J. Naughton and D. Cai, *ACS Nano* **6**, 3171-3178 (2012).
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26. *High resolution scanning electron microscopy of surface functionalized nanocoax biosensors*, G. McMahon, B. Rizal, M.J. Burns, T.C. Chiles, M. Archibald, M.J. Naughton, S. Shepard, N. Erdman and N. Kikuchi, *Microscopy and Microanalysis* **18** (S2), 276-277 (2012).
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27. *Embedded metallic nanopatterns for enhanced optical absorption*, F. Ye, M.J. Burns and M.J. Naughton, *Proc. of SPIE* **8111**, 811103 (2011).
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28. *Upper critical field in the molecular organic superconductor (DMET)₂I₃*, P. Dhakal, H. Yoshino, J.I. Oh, K. Kikuchi and M.J. Naughton, *Physical Review B* **83**, 014505 (2011).
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29. *Nanocoax solar cells based on aligned multiwalled carbon nanotube arrays*, T. Paudel, J. Rybczynski, Y.T. Gao, Y.C. Lan, Y. Peng, K. Kempa, M.J. Naughton and Z.F. Ren, *Physica Status Solidi (A)* **208**, 924-927 (2011). (JOURNAL COVER).
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30. *Innovative back reflectors and nanostructures for photocurrent enhancement in thin film amorphous silicon solar cells*, C. Eminian, F.-J. Haug, O. Cubero, X. Niquille, C. Ballif, N. Argenti, J. Rybczynski, Y. Gao, W. Gao, K. Kempa, Z.F. Ren and M.J. Naughton, *Proc. 25th European Photovoltaic Solar Energy Conf.* 2767-2770 (2011).
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31. *Observation and simulation of all angular magnetoresistance oscillation effects in the quasi-one-dimensional organic conductor (DMET)₂I₃*, P. Dhakal, H. Yoshino, J-I Oh, K. Kikuchi and M.J. Naughton, *Physical Review Letters* **105**, 067201 (2010).
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32. *Efficient nanocoax-based solar cells*, M.J. Naughton, K. Kempa, Z.F. Ren, Y. Gao, J. Rybczynski, N. Argenti, W. Gao, Y. Wang, Y. Peng, J.R. Naughton, G. McMahon, T. Paudel, Y.C. Lan, M.J. Burns, A. Shepard, M. Clary, C. Ballif, F.-J. Haug, T. Söderström, O. Cubero and C. Eminian, *Physica Status Solidi RRL* **4**, 181-183 (2010). (JOURNAL COVER).
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33. *A molecular-imprint nanosensor for ultrasensitive detection of proteins*, D. Cai, L. Ren, H. Zhao, C. Xu, L. Zhang, Y. Yu, H. Wang, Y. Lan, M.F. Roberts, J.H. Chuang, M.J. Naughton, Z.F. Ren and T.C. Chiles, *Nature Nanotechnology* **5**, 597-601 (2010).
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34. *Direct-write, focused ion beam deposited, 7 K superconducting C-Ga-O nanowire*, P. Dhakal, G. McMahon, S. Shepard, T. Kirkpatrick, J.I. Oh and M.J. Naughton, *Applied Physics Letters* **96**, 262511 (2010).
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36. *Hot electron effect in nanoscopically thin photovoltaic junctions*, K. Kempa, M.J. Naughton, Z.F. Ren, A. Herczynski, T. Kirkpatrick, J. Rybczynski and Y. Gao, *Applied Physics Letters* **95**, 233121 (2009).
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37. *Applications of multibeam SEM/FIB instrumentation in the Integrated Sciences*, G. McMahon, J. Rybczynski, Y. Wang, Y. Gao, D. Cai, P. Dhakal, N. Argenti, K. Kempa, Z.F. Ren, N. Erdman and M.J. Naughton, *Microscopy Today*, pp. 34-38 (July, 2009).
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38. *Application of dual beam FIB to the metrology of nanostructured photovoltaic devices*, G. McMahon, J. Rybczynski, Y. Wang, Y. Gao, N. Argenti, K. Kempa, Z.F. Ren and M.J. Naughton, *Microscopy and Microanalysis* **15**, 1392-1393 (2009).
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39. *In-situ electrical measurements of vertically aligned nanostructures*, G. McMahon, T. Paudel Z.F. Ren and M.J. Naughton, *Microscopy and Microanalysis* **15** (S2), 708-709 (2009).

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42. *Subwavelength transmission line for visible light*, J. Rybczynski, K. Kempa, A. Herczynski, Y. Wang, M.J. Naughton, Z.F. Ren, Z.P. Huang and M. Giersig, Applied Physics Letters **90**, 021104 (2007).
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43. *Enhanced ductile behavior of tensile-elongated individual double- and triple-walled carbon nanotubes at high temperatures*, J.Y. Huang, S. Chen, Z.F. Ren, Z. Wang, K. Kempa, M.J. Naughton, G. Chen and M.S. Dresselhaus, Physical Review Letters **98**, 185501 (2007).
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44. *Reply to Comment on “Field-enhanced diamagnetism in the pseudogap state of the cuprate $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ Superconductor in an intense magnetic field,”* N.P. Ong, Y. Wang, L. Li and M.J. Naughton, Physical Review Letters **98**, 119702 (2007).
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45. *Magnetization, Nernst effect and vorticity in the cuprates*. L. Li, Y. Wang, M.J. Naughton, S. Komiyama, S. Ono, Y. Ando and N.P. Ong, Journal of Magnetism and Magnetic Materials **310**, 460-466 (2007).
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46. *Depairing field, onset temperature and the nature of the transition in cuprates*, Lu Li, Yayu Wang, J.G. Checkelsky, M.J. Naughton, S. Komiyama, S. Ono, Y. Ando and N.P. Ong, Physica C **460**, 48-51 (2007).
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47. *Selective functionalization of 3-D polymer microstructures*, R.A. Farrer, C.N. LaFratta, L. Li, J. Praino, M.J. Naughton, B.E.A. Saleh, M.C. Teich and J.T. Fourkas, Journal of the American Chemical Society **128**, 1796-1797 (2006).
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48. *Unconventional superconductivity in a quasi-one-dimensional system $(\text{TMTSF})_2\text{X}$* , I.J. Lee, S.E. Brown and M.J. Naughton, Journal of the Physical Society of Japan **75**, 051011 (2006).
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49. *Interference effects due to commensurate electron trajectories and topological crossovers in $(\text{TMTSF})_2\text{ClO}_4$* , H.I. Ha, A.G. Lebed and M.J. Naughton, Physical Review B **73**, 033107 (2006).
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51. *Pulsed field studies of angular dependence of unconventional magnetoresistance in $(\text{TMTSF})_2\text{ClO}_4$* , H. Yoshino, Z. Bayindir, J. Roy, B. Shaw, H.I. Ha, A.G. Lebed and M.J. Naughton, AIP Conference Proceedings **850**, 1542-1543 (2006).
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52. *High field FISDW state in the organic superconductor $(\text{DMET-TSeF})_2\text{I}_3$* , K. Oshima, M.J. Naughton, E. Ohmichi, T. Osada and R. Kato, AIP Conference Proceedings **850**, 623-624 (2006).
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53. *Low temperature study of the mixed donor system $(\text{TMTSF})_{1-x}\text{TMTTF}_x)_2\text{PF}_6$: Crystal structure, ESR and transport property*, K. Oshima, T. Kambe, M.J. Naughton, K. Kato and H. Kobayashi, Journal of Low Temperature Physics **142**, 551-554 (2006).
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54. *Probing the transport properties of each individual wall within a multiwall carbon nanotubes by electric breakdown*, S. Chen, J.Y. Huang, Z.F. Ren, Z.Q. Wang, K. Kempa, M.J. Naughton, G. Chen and M.S. Dresselhaus, *Microscopy and Microanalysis* **12**, 488-489 (2006).
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55. *Aligned ultralong ZnO nanobelts and their enhanced field emission*, W.Z. Wang, B.Q. Zeng, J. Yang, B. Poudel, M.J. Naughton and Z.F. Ren, *Advanced Materials* **18**, 3275-3278 (2006).
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56. *Pulsed magnetic field study of unconventional magnetoresistance of Q1D superconductors (TMTSF)₂ClO₄ and (DMET)₂I₃*, H. Yoshino, Z. Bayindir, J. Roy, B. Shaw, H-I. Ha, A.G. Lebed, M.J. Naughton, K. Kikuchi, H. Nishikawa and K. Murata, *Journal of Physics: Conference Series* **51**, 339-342 (2006).
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Pending

(11 pending applications)