Stanford

Jennifer Dionne

Associate Professor of Materials Science and Engineering

Resume available Online

CONTACT INFORMATION

- **Administrator**

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Bio

BIO

Jennifer Dionne is an associate professor of Materials Science and Engineering at Stanford. Jen received her Ph. D. in Applied Physics at the California Institute of Technology, advised by Harry Atwater, and B.S. degrees in Physics and Systems & Electrical Engineering from Washington University in St. Louis. Prior to joining Stanford, she served as a postdoctoral researcher in Chemistry at Berkeley, advised by Paul Alivisatos. Jen's research develops new optical materials and microscopies to observe chemical and biological processes as they unfold with nanometer scale resolution. She then uses these observations to help improve energy-relevant processes (such as photocatalysis and energy storage) and medical diagnostics and therapeutics. Her work has been recognized with a Moore Inventor Fellowship (2017), the Materials Research Society Young Investigator Award (2017), Adolph Lomb Medal (2016), Sloan Foundation Fellowship (2015), and the Presidential Early Career Award for Scientists and Engineers (2014), and was recently featured on Oprah's list of "50 Things that will make you say 'Wow'!".

ACADEMIC APPOINTMENTS

- Associate Professor, Materials Science and Engineering
- Member, Bio-X
- Affiliate, Precourt Institute for Energy
- Member, Stanford Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Affiliate Faculty, Bio-X, (2015- present)
- Affiliate Faculty, Stanford Neurosciences Institute, (2015- present)
- Affiliate Faculty, Precourt Institute for Energy, (2012- present)

HONORS AND AWARDS

- Materials Research Society Outstanding Young Investigator, Materials Research Society (2017)
- Nano Letters Young Investigator Lectureship, American Chemical Society (2017)
- Tau Beta Pi Teaching Honor Roll, Tau Beta Pi, Stanford (2017)
- Adolph Lomb Medal, Optical Society of America (2016)

- Outstanding Undergraduate Engineering Professor, Tau Beta Pi (2016)
- Camille Dreyfus Teacher-Scholar Award, Dreyfus Foundation (2015)
- Sloan Research Fellowship, Sloan Foundation (2015)
- Presidential Early Career Award in Science and Engineering, United States government (2014)
- Kavli Early Career Lectureship in Nanoscience, Materials Research Society (2013)
- Oprah's 50 things that will make you say 'Wow!', Oprah Magazine (2013)
- Outstanding Young Alumni Award, Washington University in St. Louis (2012)
- CAREER Award, National Science Foundation (2011)
- TR35, Technology Review (2011)
- Frederick E. Terman Fellow, Stanford University (2010)
- Robert Noyce Family Faculty Fellow, Robert Noyce Scholarship & Fellowship Programs (2010)
- Young Investigator, Air Force Office of Scientific Research (2010)
- Francis Clauser Prize, Clauser family (2009)
- Gold Award, Materials Research Society (2008)

PROFESSIONAL EDUCATION

- PhD, California Institute of Technology , Applied Physics (2009)
- MS, California Institute of Technology , Applied Physics (2005)
- BS, Washington University in St. Louis , Physics (2003)
- BS, Washington University in St. Louis , Systems Science and Mathematics (2003)

LINKS

- http://dionne.stanford.edu: http://dionne.stanford.edu

Teaching

COURSES

2017-18

- Electronic Materials Engineering: MATSCI 152 (Spr)
- Science of the Impossible: MATSCI 82N (Spr)
- Waves and Diffraction in Solids: MATSCI 195, MATSCI 205, PHOTON 205 (Win)

2016-17

- Electronic Materials Engineering: MATSCI 152 (Spr)
- Science of the Impossible: MATSCI 82N (Spr)

2015-16

- Electronic Materials Engineering: MATSCI 152 (Spr)
- Materials Science Colloquium: MATSCI 230 (Win)
- Science of the Impossible: MATSCI 82N (Spr)

2014-15

- Electronic Materials Engineering: MATSCI 152 (Spr)
- Science of the Impossible: MATSCI 82N (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Stefan Fischer, Mark Lawrence, Randy Mehlenbacher, Amr Ahmed Essawi Saleh, Michal Vadai Eilat, Yang Zhao

Doctoral Dissertation Advisor (AC)

Fariah Hayee

Publications

PUBLICATIONS

- **Subwavelength-scale plasmon waveguides** *Surface Plasmon Photonics*
  Atwater, H., Dionne, J., Sweatlock, L.
  edited by Brongersma, M., L., Kik, P., G.
  Dordrecht, NL: Springer.: 87–104
- **Temperature-dependent optical properties of titanium nitride** *APPLIED PHYSICS LETTERS*
  Briggs, J. A., Naik, G. V., Zhao, Y., Petach, T. A., Sahasrabuddhe, K., Goldhaber-Gordon, D., Melosh, N. A., Dionne, J. A.
  2017; 110 (10)
- **Enhancing Enantioselective Absorption Using Dielectric Nanospheres** *ACS PHOTONICS*
  Ho, C., Garcia-Etxarri, A., Zhao, Y., Dionne, J.
  2017; 4 (2): 197-203
- **Direct visualization of hydrogen absorption dynamics in individual palladium nanoparticles** *NATURE COMMUNICATIONS*
  Narayan, T. C., Hayee, F., Baldi, A., Koh, A. L., Sinclair, R., Dionne, J. A.
  2017; 8
- **Direct visualization of hydrogen absorption dynamics in individual palladium nanoparticles.** *Nature communications*
  Narayan, T. C., Hayee, F., Baldi, A., Leen Koh, A., Sinclair, R., Dionne, J. A.
  2017; 8: 14020-?
- **Grating-flanked plasmonic coaxial apertures for efficient fiber optical tweezers.** *Optics express*
  Saleh, A. A., Sheikhoelislami, S., Gastelum, S., Dionne, J. A.
  2016; 24 (18): 20593-20603
- **Enhancing Quantum Yield via Local Symmetry Distortion in Lanthanide-Based Upconverting Nanoparticles** *ACS PHOTONICS*
  Wisser, M. D., Fischer, S., Maurer, P. C., Bronstein, N. D., Chu, S., Alivisatos, A. P., Salleo, A., Dionne, J. A.
  2016; 3 (8): 1523-1530
- **Reconstructing solute-induced phase transformations within individual nanocrystals** *NATURE MATERIALS*
  Narayan, T. C., Baldi, A., Koh, A. L., Sinclair, R., Dionne, J. A.
  2016; 15 (7): 768-?
- **Roadmap on optical energy conversion** *JOURNAL OF OPTICS*
  Boriskina, S. V., Green, M. A., Catchpole, K., Yablonovitch, E., Beard, M. C., Okada, Y., Lany, S., Gershon, T., Zakutayev, A., Tahersima, M. H., Sorger, V. J., Naughton, M. J., Kempa, et al
  2016; 18 (7)
- **Towards nanoscale multiplexing with parity-time-symmetric plasmonic coaxial waveguides** *PHYSICAL REVIEW B*
  Alaeian, H., Baum, B., Jankovic, V., Lawrence, M., Dionne, J. A.
  2016; 93 (20)
- **Enantioselective Optical Trapping of Chiral Nanoparticles with Plasmonic Tweezers** *ACS PHOTONICS*
  Zhao, Y., Saleh, A. A., Dionne, J. A.
  2016; 3 (3): 304-309

- **Fully CMOS-compatible titanium nitride nanoantennas** *APPLIED PHYSICS LETTERS*
  Briggs, J. A., Naik, G. V., Petach, T. A., Baum, B. K., Goldhaber-Gordon, D., Dionne, J. A.
  2016; 108 (5)
- **Evolution of Plasmonic Metamolecule Modes in the Quantum Tunneling Regime.** *ACS nano*
  Scholl, J. A., Garcia-Etxarri, A., Aguirregabiria, G., Esteban, R., Narayan, T. C., Koh, A. L., Aizpurua, J., Dionne, J. A.
  2016; 10 (1): 1346-1354
- **Plasmonics feature issue: publisher's note** *OPTICAL MATERIALS EXPRESS*
  Boltasseva, A., Dionne, J.
  2015; 5 (12): 2978-2978
- **Localized fields, global impact: Industrial applications of resonant plasmonic materials** *MRS BULLETIN*
  Dionne, J. A., Baldi, A., Baum, B., Ho, C., Jankovic, V., Naik, G. V., Narayan, T., Scholl, J. A., Zhao, Y.
  2015; 40 (12): 1138-1145
- **Feature issue introduction: plasmonics** *OPTICAL MATERIALS EXPRESS*
  Boltasseva, A., Dionne, J.
  2015; 5 (11): 2698-2701
- **Photon upconversion with hot carriers in plasmonic systems** *APPLIED PHYSICS LETTERS*
  Naik, G. V., Dionne, J. A.
  2015; 107 (13)
- **Polymer lattices as mechanically tunable 3-dimensional photonic crystals operating in the infrared** *APPLIED PHYSICS LETTERS*
  Chernow, V. F., Alaeian, H., Dionne, J. A., Greer, J. R.
  2015; 107 (10)
- **Controlling electric, magnetic, and chiral dipolar emission with PT-symmetric potentials** *PHYSICAL REVIEW B*
  Alaeian, H., Dionne, J. A.
  2015; 91 (24)
- **Nanoscale optical tomography with cathodoluminescence spectroscopy** *NATURE NANOTECHNOLOGY*
  Atre, A. C., Brenny, B. J., Coenen, T., Garcia-Etxarri, A., Polman, A., Dionne, J. A.
  2015; 10 (5): 429-436
- **Strain-induced modification of optical selection rules in lanthanide-based upconverting nanoparticles.** *Nano letters*
  Wisser, M. D., Chea, M., Lin, Y., Wu, D. M., Mao, W. L., Salleo, A., Dionne, J. A.
  2015; 15 (3): 1891-1897
- **Lights, nano, action! New plasmonic materials and methods to probe nanoscale phenomena** *MRS BULLETIN*
  Dionne, J. A.
  2015; 40 (3): 264-270
- **A parity-time symmetric coherent plasmonic absorber-amplifier** *JOURNAL OF APPLIED PHYSICS*
  Baum, B., Alaeian, H., Dionne, J.
  2015; 117 (6)
- **Probing Complex Reflection Coefficients in One-Dimensional Surface Plasmon Polariton Waveguides and Cavities Using STEM EELS.** *Nano letters*
  Schoen, D. T., Atre, A. C., García-Etxarri, A., Dionne, J. A., Brongersma, M. L.
  2015; 15 (1): 120-126
- **Upconversion for Enhanced Photovoltaics** *3rd Physics of Sustainable Energy (PSE) Conference*
  Briggs, J. A., Wu, D. M., Atre, A. C., Garcia-Etxarri, A., Dionne, J. A.
  AMER INST PHYSICS.2015: 33–43
- **In situ detection of hydrogen-induced phase transitions in individual palladium nanocrystals** *NATURE MATERIALS*
  Baldi, A., Narayan, T. C., Koh, A. L., Dionne, J. A.
  2014; 13 (12): 1143-1148

- **Plasmon-Enhanced Upconversion** *JOURNAL OF PHYSICAL CHEMISTRY LETTERS*
  Wu, D. M., Garcia-Etxarri, A., Salleo, A., Dionne, J. A.
  2014; 5 (22): 4020-4031
- **Plasmon-Enhanced Upconversion.** *journal of physical chemistry letters*
  Wu, D. M., García-Etxarri, A., Salleo, A., Dionne, J. A.
  2014; 5 (22): 4020-4031
- **Parity-time-symmetric plasmonic metamaterials** *PHYSICAL REVIEW A*
  Alaeian, H., Dionne, J. A.
  2014; 89 (3)
- **Non-Hermitian nanophotonic and plasmonic waveguides** *PHYSICAL REVIEW B*
  Alaeian, H., Dionne, J. A.
  2014; 89 (7)
- **A metafluid exhibiting strong optical magnetism.** *Nano letters*
  Sheikholeslami, S. N., Alaeian, H., Koh, A. L., Dionne, J. A.
  2013; 13 (9): 4137-4141
- **Surface-enhanced circular dichroism spectroscopy mediated by nonchiral nanoantennas** *PHYSICAL REVIEW B*
  Garcia-Etxarri, A., Dionne, J. A.
  2013; 87 (23)
- **NANOPLASMONICS Plasmons rock in metal bands** *NATURE MATERIALS*
  Dionne, J. A.
  2013; 12 (5): 380-381
- **A Broadband Negative Index Metamaterial at Optical Frequencies** *ADVANCED OPTICAL MATERIALS*
  Atre, A. C., Garcia-Etxarri, A., Alaeian, H., Dionne, J. A.
  2013; 1 (4): 327-333
- **Narrow-bandwidth solar upconversion: Case studies of existing systems and generalized fundamental limits** *JOURNAL OF APPLIED PHYSICS*
  Briggs, J. A., Atre, A. C., Dionne, J. A.
  2013; 113 (12)
- **Observation of Quantum Tunneling between Two Plasmonic Nanoparticles** *NANO LETTERS*
  Scholl, J. A., Garcia-Etxarri, A., Koh, A. L., Dionne, J. A.
  2013; 13 (2): 564-569
- **Plasmons rock in metal bands** *Nature Materials 12*
  Dionne, J.
  2013: 380
- **Toward Efficient Optical Trapping of Sub-10-nm Particles with Coaxial Plasmonic Apertures** *NANO LETTERS*
  Saleh, A. A., Dionne, J. A.
  2012; 12 (11): 5581-5586
- **Plasmonics: Metal-worthy methods and materials in nanophotonics** *MRS BULLETIN*
  Dionne, J. A., Atwater, H. A.
  2012; 37 (8): 717-724
- **Plasmon nanoparticle superlattices as optical-frequency magnetic metamaterials** *OPTICS EXPRESS*
  Alaeian, H., Dionne, J. A.
  2012; 20 (14): 15781-15796
- **Opportunities and Challenges of Using Plasmonic Components in Nanophotonic Architectures** *IEEE JOURNAL ON EMERGING AND SELECTED TOPICS IN CIRCUITS AND SYSTEMS*
  Wassel, H. M., Dai, D., Tiwari, M., Valamehr, J. K., Theogarajan, L., Dionne, J., Chong, F. T., Sherwood, T.
  2012; 2 (2): 154-168

- **Quantum plasmon resonances of individual metallic nanoparticles** *NATURE*
  Scholl, J. A., Koh, A. L., Dionne, J. A.
  2012; 483 (7390): 421-U68
- **Toward high-efficiency solar upconversion with plasmonic nanostructures** *JOURNAL OF OPTICS*
  Atre, A. C., Garcia-Etxarri, A., Alaeian, H., Dionne, J. A.
  2012; 14 (2)
- **Optimized light absorption in Si wire array solar cells** *JOURNAL OF OPTICS*
  Alaeian, H., Atre, A. C., Dionne, J. A.
  2012; 14 (2)
- **Waveguides with a silver lining: Low threshold gain and giant modal gain in active cylindrical and coaxial plasmonic devices** *PHYSICAL REVIEW B*
  Saleh, A. A., Dionne, J. A.
  2012; 85 (4)
- **Mirror, Mirror** *Physics 5*
  Dionne, J.
  2012: 38
- **Controlling the Interplay of Electric and Magnetic Modes via Fano-like Plasmon Resonances** *NANO LETTERS*
  Sheikholeslami, S. N., Garcia-Etxarri, A., Dionne, J. A.
  2011; 11 (9): 3927-3934
- **Realistic upconverter-enhanced solar cells with non-ideal absorption and recombination efficiencies** *JOURNAL OF APPLIED PHYSICS*
  Atre, A. C., Dionne, J. A.
  2011; 110 (3)
- **Giving photovoltaics the green light: Plasmon-enhanced upconversion for broadband solar absorption** *IEEE Photonics Conference (PHO)*
  Dionne, J. A., Atre, A., Alaeian, H., Garcia, A.
  IEEE.2011: 447–448
- **Observations of shape-dependent hydrogen uptake trajectories from single nanocrystals** *JACS Communications*
  Tang, M., L., Liu, N., Dionne, J., Alivisatos, A., P.
  2011
- **Si-based plasmonics for on-chip photonics** *invited review, Journal of Selected Topics in Quantum Electronics*
  Dionne, J., Sweatlock, L., Sheldon, M., Alivisatos, A., P., Atwater, H.
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- **PlasMOStor: a metal-oxide-silicon field-effect plasmonic modulator** *Nano Letters 9*
  Dionne, J., Diest, K., Sweatlock, L., Atwater, H.
  2009: 897
- **Flatland Photonics: Circumventing diffraction with planar plasmonic architectures** *Caltech Thesis*
  Dionne, J.
  2009
- **Tunable color filters based on metal-insulator-metal resonators** *Nano Letters 9*
  Diest, K., Dionne, J., Spain, M., Atwater, H.
  2009: 2579
- **Are negative index materials achievable with surface plasmon waveguides? A case study of three plasmonic geometries** *Optics Express 16*
  Dionne, J., Verhagen, E., Polman, A., Atwater, H.
  2008: 19001
- **Near field visualization of strongly confined surface plasmon polaritons in metal-insulator-metal waveguides** *Nano Letters 8*
  Verhagen, E., Dionne, J., Kuipers, K., Atwater, H., Polman, A.
  2008: 2925

- **Silver diffusion bonding and layer transfer of lithium niobate to silver** *Applied Physics Letters 93*
  Diest, K., Archer, M., Dionne, J., Czubakowski, M., Atwater, H.
  2008: 092906
- **Negative refraction at visible frequencies** *Science 316*
  Lezec, H., Dionne, J., Atwater, H.
  2007: 430
- **Highly confined photon transport in subwavelength metallic slot waveguides** *NanoLetters 6*
  Dionne, J., Lezec, H., Atwater, H.
  2006: 1928
- **Plasmon slot waveguides: Towards chip-scale propagation with subwavelenth-scale localization** *Phys. Rev. B 73*
  Dionne, J., Sweatlock, L., Polman, A., Atwater, H.
  2006: 035407
- **Planar metal plasmon waveguides: frequency-dependent dispersion, propagation, localization, and loss beyond the free electron model** *Phys. Rev. B 72*
  Dionne, J., Sweatlock, L., Polman, A., Atwater, H.
  2005: 075405
- **The new 'PN junction': Plasmonics enables photonic access to the nanoworld** *MRS Bulletin*
  Atwater, H., Maier, S., Polman, A., Dionne, J., Sweatlock, L.
  2005: 30