Trevor S. Kelly

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Research Consulting and Tutoring Website - https://www.trevorskelly.com
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My goal is to utilize my theoretical and experimental skills in physics to model and design solutions for various applications using computational simulations and experimental verification.

EDUCATION

M.S. Physics, San Francisco State University **Aug 2017**
B.S. Physics, San Francisco State University **May 2014**

EXPERIENCE

- **Research & Development Consulting,**
  General Development of Novel Technical Physics Projects **Oct 2017 to Present**
  Research and Development of specific physics/optics/photonics/fluid dynamics application ideas from original conception to completion.
  i. Researching and applying information in the development of theoretical models and application designs, summarizing technical information, generating computational and experimental methods to verify models.
  ii. Modeling and simulating designs and devices via Python, C, MATLAB, Mathematica and COMSOL. Performing statistical analysis and optimization on designs, and applying changes to achieve maximum performance. Visualizing data and results for easy understanding.
  iii. Experimental verification of model by data acquisition using tools applicable for specific design. Statistical analysis of data and presentation of results.

- **Private Physics, Math, Chemistry Tutor** **Sept 2014 to Present**
  i. Physics and Mathematics, Graduate level. Chemistry, general I, II. Wyzant (tutoring platform) link https://www.wyzant.com/Tutors/PhysicsMath_TrevorK.

- **Research & Development,**
  Biomedical Physics Applications Company (Restricted name due to NDA**)** **Oct 2017 to July 2018**

  Development of Bio-medical consumer product from original conception to completion. Applying laser physics for bio-medical applications. Verifying power, wavelength, and fluence from radiation sources with various photonic tools. Applying computational methods for experimental modeling and data extraction.
  iv. Researching information and applying knowledge in development of application, summarize technical information, testing of products.
  v. Accommodating FDA constraints to successfully obtain FDA clearance for consumer products.
  vi. Leading computational simulations by creating script to calculate and simulate the radiation dose of a particular area for any number and arrangement of radiation sources in flat or curved orientations. Visualizing data for easy understanding.
  vii. Scientific liaison with vendors, figuring physical parameters needed for product.

- **Research Assistant I,**
  Quantum Optics Lab under Dr. Zhigang Chen, SFSU **Sept 2017 to Apr 2018**
- **Graduate Research Assistant, Quantum Optics Lab, SFSU** **June 2014 to Sept 2017**

  http://www.physics.sfsu.edu/~laser/

Conducting experiments using lasers and metallic/organic suspensions. Routine Power Point presentations of new scientific concepts and data. Applying computational methods for experimental modeling and data extraction.

i. Optical manipulation of Plasmonic resonant solitons and biological samples using optical tweezers and self-focusing effects, (focusing induced by refractive index shift via optical gradient forces) to study the nonlinear interactions involved with Gaussian profile laser beams in metallic nanosuspensions and organic colloidal suspensions.

ii. Study of soliton-mediated orientational ordering of gold nanorod plasmonic suspension due to the optical electric field, with verification by measuring the birefringence and dichroism of ordering.

PROGRAMMING SKILLS

- Extensive experience with MATLAB, Mathematica, Python, C, Scientific Workplace.
- Using LabVIEW to set up computer controlled data acquisition with GPIB and USB interface.
- Writing scripts, using Python, C, MATLAB and Mathematica for error analysis, numerical integration and differentiation, multi-body simulation, partial differential equation solvers, and much more.

HONORS AND AWARDS

- **College of Science & Engineering Student Project Showcase, 3rd place Graduate SFSU May 2015**
- **Eden Academic Excellence Award, for Physics students, one of 7 recipients, SFSU Spring 2014**
- **State University Grant, SFSU Spring 2013, Fall 2013, Spring 2014**

PROFESSIONAL AFFILIATIONS

- American Physical Society (APS)
- The Optical Society (OSA)
- International Society for Optics and Photonics (SPIE)

PUBLICATIONS

- Huizong Xu, Pepito Alvaro, Yinxiao Xiang, Trevor S. Kelly, Yu-Xuan Ren, Chensong Zhang, and Zhigang Chen. "Plasmonic resonant nonlinearity and synthetic optical properties in gold nanorod suspensions," Photonics Research Vol. 7, Issue 1, pp. 28-35, 2019.
- Yu-Xuan Ren, **Trevor S. Kelly**, Chensong Zhang, Huizong Xu, Zhigang Chen. "Soliton-mediated orientational ordering of gold nanorods and birefringence in plasmonic suspensions," Optics letters Vol. 42, Issue 3, pp. 627-630, February 2017.
- **Trevor S. Kelly**, Yu-Xuan Ren, Akbar Samadi, Anna Bezryadina, Demetrios Christodoulides, Zhigang Chen. "Guiding and nonlinear coupling of light in plasmonic nanosuspensions," Optics letters Vol. 41, Issue 16, pp. 3817-3820, August 2016.

CONFERENCE PRESENTATIONS

- Huizong Xu (Presenter**)**, **T. Kelly**, Pepito Alvaro, Y. Ren, Chensong Zhang, Yinxiao Xiang, Zhigang Chen. "Synthetic Optical Anisotropy via Plasmonic Resonant Tuning of Nanorod Orientation," in *Conference on Lasers and Electro-Optics* (CLEO), (Optical Society of America, 2018) https://www.osapublishing.org/abstract.cfm?uri=CLEO_QELS-2018-FF3F.4
- Y. Ren, **T. Kelly (Presenter)**, Chensong Zhang, Huizong Xu, Zhigang Chen. "Soliton-mediated orientational ordering of gold nanorods and birefringence in plasmonic suspensions," in *Conference on Lasers and Electro-Optics* (CLEO), (Optical Society of America, 2017) https://www.osapublishing.org/abstract.cfm?uri=CLEO_QELS-2017-FM4F.5

- Y. Ren, Josh Lamstein (Presenter**), T. Kelly,** Chensong Zhang, Yong Sun, Claudio Conti, Demetrios N. Christodoulides, and Zhigang Chen. "Rogue waves in red blood cell suspensions," in *Conference on Lasers and Electro-Optics* (CLEO), (Optical Society of America, 2017) https://www.osapublishing.org/abstract.cfm?uri=cleo_qels-2017-FM4F.1&origin=search
- Y. Ren, **T. Kelly (Presenter)**, A. Samadi, A. Bezryadina, D. N. Christodoulides, and Z. Chen. "Guiding and Coupling Light through Nonlinear Plasmonic Nanosuspensions," in *Conference on Lasers and Electro-Optics* (CLEO), (Optical Society of America, 2016) https://www.osapublishing.org/abstract.cfm?uri=cleo_qels-2016-FTh3A.2
- **Trevor S. Kelly, (Presenter),** Akbar Samadi, Anna Bezryadina and Zhigang Chen. "Guiding light by plasmonic resonant solitons in metallic nanosuspensions," SPIE 9546, Active Photonic Materials VII, 95461R (September 1 2015) doi:10.1117/12.2188792 http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=2455573