

**Kevin E. Claytor**

U.S. Citizen

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Website: <http://www.duke.edu/~kec30/>**Primary Education Information:**

Los Alamos High School (2005) GPA = 4.11

Rice University; B.S. Physics and B.A. Mathematics (2009) GPA = 3.72

Duke University; Graduate Student Physics, Ph.D track.

**Research Experience:**

Rice University – Rice Quantum Institute (RQI) under Dr. Stephan Link. 2008 – Present. Performing senior thesis research into plasmon lifetime dependence on the environment via joint spectral amplitude and phase information.

<http://www.owl.net.rice.edu/~slink/>

University of Illinois at Urbana Champaign – Research Experience for Undergraduates (NSF REU) under Dr. Ido Golding. 2008 – Developed hardware and software to capture and analyze images of petri-dishes for cell colonies, specifically in completely automated colony counting over a wide spectrum of colony sizes and dish parameters.

<http://www.owl.net.rice.edu/~kec4482/colony.html>

Rice University – Rice Quantum Institute (RQI) under Dr. Stephan Link. 2007 – Developed program to locate and track nanocars (Shirai, Y., et. al. “Recent Progress on Nanovehicles,” *Chem. Soc. Rev.* **2006**, 35, 1043-1055). Collected data using a scanning confocal microscope and polarized photomultiplier tube setup. Coordinated upgrade of RHK (scan controller) unit, improving performance. Currently constructing a second laser scanning microscope.

<http://www.owl.net.rice.edu/~slink/>

Los Alamos National Laboratory – Earth and Environmental Science Division (EES) under Dr. James TenCate. 2003 – Stress-strain measurements on various rocks. 2004 – Stress-strain and resonance measurements on various rocks. 2005 – continued stress strain measurements. 2006 – continued measurements, presented in the Student Symposium 2006 (won undergraduate award (see below)), wrote open-source Matlab stress-strain simulator;

<http://www.owl.net.rice.edu/~kec4482/pmspace.html>

<http://www.ees.lanl.gov/ees11/>

Science Fair Experience – I performed independent research in high school, consisting of using a homebuilt power supply and nanosecond laser. Using this setup, investigations in laser ablation and acoustic wave generation were investigated. The later particularly for uses in non-destructive materials analysis. See “Awards” for more information.

**Research Interests:**

My primary interests are the physical sciences, specifically the combination of optics, laser science, and nanotechnology. I am very interested in the small scale, and the non-intuitive interactions that take place on this level. The wide range of laser interaction with materials, from low power absorption and excitation of phonons, plasmons and fluorescence to high power ablation and two-photon processes is a field in which I have long had an interest and would like to continue exploring. These interests have led me to the fields of nano-photonics and plasmonics. I am particularly interested in how lasers may be applied as unique sensors for non-destructive, in-situ chemical, biological, and mechanical measurements, and hope to bring to fruition many related applications.

**Papers and Presentations:**

- K. Claytor, S. Khatua, J. Guerrero, J. Tour, S. Link, "Accurately Determining Single Molecule Trajectories of Molecular Motion on Surfaces," *Journal of Chemical Physics*. Vol. 130 No. 16. 2009.
- K.E. Claytor, J.R. Koby, J.A. TenCate, "Limitations of Preisach Theory: Elastic aftereffect, congruence, and end point memory," *Geophysical Research Letters*. 36, L06304, 2009.
- S. Khatua, J. Guerrero, K. Claytor, G. Vives, A. Kolomeisky, J. Tour, S. Link, "Micrometer-Scale Translation and Monitoring of Individual Nanocars on Glass," *ACS Nano Article ASAP*. Jan 9. 2009.
- K. Claytor, S. Kathya, S. Link. Tracking Nanocars using Optical Methods. (Poster) Rice Quantum Institute (RQI) Student Symposium. 2007.
- K.E. Claytor, J. A. TenCate. A Novel Investigation of Nonlinear Rock Properties. (Poster) LANL Student Symposium. 2006. (Awarded the "Best Undergraduate Research Poster" in Earth and Environmental Sciences.)
- Stress Strain Curves in Rocks, K. E. Claytor and J. A. TenCate. (Oral Presentation) Presented at the 10<sup>th</sup> International Conference on Non-Linear Dynamics. 2003.

**Class Experience:**

Physics: Senior thesis, solid state, statistical mechanics and thermodynamics, nuclear and particle, intermediate mechanics and electromagnetism, undergraduate quantum mechanics, waves and optics, physical chemistry, computational physics, upper level physics labs.

Mathematics: Single and multi-variable calculus, differential equations, combinatorics, linear algebra, partial differential equations, complex analysis, abstract algebra (group theory), introduction to computational mathematics.

Other: Introductory biology and chemistry.

**Scholarships:**

Max Roy Scholarship (Rice University)

Century Scholars (<http://financialaid.rice.edu/main.aspx?id=62>)

LANL Foundation Scholar (<https://www.lanlfoundation.org/>)

Robert Oppenheimer Memorial Scholarship (<http://www.jromc.org/>)

**Awards:**

*NSF*: GRFP Honorable Mention List (2009)

*Robert A. Welch Foundation*: Predoctoral Fellowship (2007) (Grant No. C-1664)

**Siemens-Westinghouse Competition:** 2004 – National Winner

[http://www.siemens-foundation.org/en/competition/2004\\_winners/kevin\\_claytor.htm](http://www.siemens-foundation.org/en/competition/2004_winners/kevin_claytor.htm)

**Intel Science Talent Search:** 2004 – Semi-finalist.

**Lucent Global Science Scholar:** 2005 – National Finalist.

**Science Fair Awards:**

2004 Intel International Science and Engineering Fair (ISEF): Grand Prize in Physics 3<sup>rd</sup> with special awards from the Society for Exploration Geophysicists (SEG) and the American Association of Physics Teachers (AAPT).

New Mexico State Fair: Physics 3<sup>rd</sup>

New Mexico Northeastern Regional Fair: Physics 1<sup>st</sup>, Best of Show – Physical Sciences

2003 ISEF: Grand Prize in Physics 3<sup>rd</sup>

New Mexico State Fair: Physics 1<sup>st</sup>, alternate to Best of Show – Physical Sciences

New Mexico Northeastern Regional Fair: Physics 1<sup>st</sup>, Best of Show – Physical Sciences

2002 ISEF: Grand Prize in Physics 4<sup>th</sup> with a special award from the Optical Society of America –

**Extracurricular Activities:**

Martel Mentors (2007-present) – A mentoring program established at my residential college to provide academic mentoring to students. My responsibilities include leading weekly review / assistance sessions, and review sessions prior to tests. Contact: Jenna Hook (Jenna.L.Hook@rice.edu).

Lab Assistant for the Blind and Visually Impaired (2008-present) – Provide assistance to BVI students in upper level physics labs. Contact: Jean Ashmore (ashmore@rice.edu).

Martel College Government (2007-2008) – Served as Prime Minister, a position responsible for organizing events and managing the college budget. (2008-present) – Serving as Senior Class Representative and Senior Committee Co-Chair, responsible for voting on college issues and organizing events for the senior class, and the Martel senior class gift. Contact: Gerald Dickens (jerry@rice.edu)

Martel Men's Bike Team (2007-2009) – I was co-captain of the Martel Men's Bike team, responsible for organizing practices, maintaining the bikes and other equipment, and coordinating for the inter-residential college Rice University spring bike race.

Step Ahead Program (2006-2007) – A program to increase the computer literacy among the Rice custodial and maintenance staff.

**Nominations:**

National Society of Collegiate Scholars (NSCS) (2006+)

**Skills:**

Programming; MATLAB, C, C++, LaTeX, and HTML.

Lab equipment; Oscilloscopes (digital and analog), amplifiers and lock-ins, Ti:Sapphire and Nd:YAG lasers, tensile/compression stress testers, optical setups.

Machine shop equipment; Lathes, drill presses, routers, mills, band saws.

College level electronics. Trained in laser and electrical safety (LANL). Microsoft Office, Kalidagraph, Igor.