

## **Andrew J. Osgood**

San Diego, CA  
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I specialize in bringing order and creative data-driven scientific solutions to unstructured problems throughout a wide range of both DoD and scientific areas, thanks to more than a decade of experience in research and analysis.

What that means is that I've worked in a lab, studying and manipulating individual atoms and molecules at temperatures from near absolute zero to hundreds of degrees, in vacuum conditions cleaner than any bit of outer space from here to moon and beyond. I've developed and fabricated experiments that took months to design, and weeks bent over a bench to build, only to watch it fail within moments of testing on an apparatus I helped create. Then I've done it again and again and again, correcting weaknesses and flaws until it finally worked. I've written and published papers based on those successes, and failures. I've remained dedicated to projects through the tough times when years of results were invalidated, labs were flooded, and collaborators stopped collaborating. I've seen those seemingly impossible projects through to fruition.

I've also worked in offices, on ships, in tents, and out of various military bases around the world on concerns and issues that the Navy and Marine Corps often has trouble defining. I've walked into the Pentagon with no more than a few months' experience and briefed a two-star admiral on a project I had only recently taken over, resulting in crucial changes to how people thought and talked about the issue. I've been a part of team studies involving more than twenty other analysts, and also directed a few smaller projects on my own that help inform billion-dollar acquisition decisions. I've driven ten hours through the night to an unknown destination so I could ride a hovercraft to an amphibious ship to collect and record operational data for an unknown length of time. I've traveled to various commands around the world to talk to and interview everyone from enlisted to flag level, contractors to SES, just so I could learn enough about a topic to ask the right questions. I've worked directly with a Navy command for a two-star admiral, acting as objective advisor and analyst, and as just another seat in a three number N-code. I've designed data collection, reconstruction, and analysis plans for multi-national exercises whose results are reported to the CNO. I proposed, organized, designed, and directed a multi-command collaboration for the operational test and evaluation of aging systems to determine future concepts of employment.

I started with no appreciable experience in this field, and worked through on-the-job experience and self-directed training to become a subject matter expert in fewer than two years. I believe I can do a little bit of anything, but within a short amount of time, can learn to do a lot, better.

## Experience

### **DOD – related**

#### CNA Field Analyst to NMAWC

August 2010 - Current

*NMAWC (Naval Mine and Anti-Submarine Warfare Command) - San Diego, CA*

*CNA (Center for Naval Analyses)*

Produced flag-level, data-driven, objective analytical products focused on mine and undersea warfare and countermeasures, operations research and analysis, and ship and shore-side exercise support

- Developed and executed systems testing and CONOP/CONEMP validation events with program-level influence
- Led data collection, reconstruction and analysis for force-level assessments
- Initiated major revisions of reconstruction and assessment methodologies
- Developed proposals for major Navy-funded CNA studies
- US DOD Security Clearance

#### Research Scientist

June 2008 - August 2010

*CNA - Alexandria, VA*

Conducted objective independent and group analytical projects for the US Navy and Marine Corps including:

- Naval aviation reserve recapitalization – helped determine cost-effective recapitalization strategies
- Major naval weapons systems AoA – developed and evaluated complex system comparison matrices as a fundamental step in the acquisition process
- Combat logistics force efficiency and use – found and documented potential efficiencies through data base management and analyses
- Operations analyses – embarked during operations to gather data and observations for force-flow studies

### **Research**

#### Graduate Research Assistant

2002 – 2008

*Rice University*

- Developed new techniques, experiments, theories, and research tracks for completely new nanoscale surface systems
- Investigated aspects of nanotechnology, including the novel Nanocar, fullerenes, nanotubes, SAMs, and dynamic single molecule devices
- Developed an aptitude for scanning probe microscopy, ultra high vacuum surface science tools, and chemical self-assembly
- Performed data and image analysis/processing with MATLAB, WSxM, WinSTM, XPM Pro, and other software
- Supervised research of beginning graduate students and undergraduates

#### Undergraduate Research Fellow

2001

*Princeton Plasma Physics Laboratory - Princeton, NJ*

- Directed, and ran simulations for the National Spherical Torus Experiment
- Edited and wrote code in Fortran and C++ for simulation software
- Organized, interpreted, and presented findings to committee

## Writing / Teaching

Workshop Instructor 2005  
*Rice University* - Houston, TX

- Led workshops and taught introductory vector math to undergraduate physics students

Tutor, Mentor, Assistant 1999 - 2001  
*Muhlenberg College* - Allentown, PA

- Assessed students' writing problems and difficulties and devised both immediate and long-term solutions
- Worked with professors to develop first-year class curricula
- Ran group workshops and private sessions to help cultivate better writing technique and ability

Promotional Copywriter 2000  
*Harcourt Health Sciences / W. B Saunders* - Philadelphia, PA

- Wrote original copy and edited past copy for promotional materials
- Researched and evaluated unpublished health-sciences titles for inclusion in future promotions

Teaching Assistant 1999 - 2000  
*Muhlenberg College* - Allentown, PA

- Ran introductory undergraduate physics lab sessions
- Provided guidance and help on homework problem sets

## Education

**Rice University, Houston, TX**

Ph.D. Applied Physics 2008

Thesis: "Variable Temperature Scanning Tunneling Microscopy Analysis of Nanocar Dynamics"

M.S. Applied Physics 2005

Thesis: "Investigation and Manipulation of New Fullerene Derivative Molecules by Scanning Tunneling Microscopy"

**Muhlenberg College, Allentown, PA**

B.S. Double Major – Physics, English 2002  
GPA: 3.618

## Honors and Awards

Recognized for *most downloaded* research article of all ACS journals 2005

Robert A. Boyer Physics Award 2002

Clifford R. Moyer Memorial Prize in Physics 2001

Dean's List 1998 - 2002

Muhlenberg Scholar 1998 - 2002

Muhlenberg Presidential Scholarship 1998 - 2002

## Student Activities

Phi Kappa Tau, Eta chapter founding brother, community service and fundraising chairman	2000 – 2002
Student Advisor	1999 – 2002
Society of Physics Students chapter Co-Founder and Vice President	2000 - 2001
Muhlenberg Campus Delegate	1999 – 2001
Muhlenberg Weekly Staff Writer	1999 – 2000

## Publications

### Directional Control in Thermally Driven Single-Molecule Nanocars

Yasuhiro Shirai, Andrew J. Osgood, Yuming Zhao, Kevin F. Kelly, James M. Tour  
*Nano Letters* **5**(11), 2330 (2005). \*Was the #1 most-accessed ACS journal article of 2005

### Surface-Rolling Molecules

Y. Shirai, Andrew J. Osgood et. al.  
*J. Am. Chem. Soc.*, **128** (14), 4854 (2006).

### Nanocar Step Crossing Facilitated by the Smoluchowski Effect

Andrew J. Osgood, Yasuhiro Shirai, Takashi Sasaki, James M. Tour, Kevin F. Kelly  
*Physical Review Letters*

### The Nanocar Family of Fullerene-derivative Molecules: Behavior and Properties

Andrew J. Osgood, Takashi Sasaki, Yasuhiro Shirai, James M. Tour, Kevin F. Kelly  
*ACS Nano*

### Automated Large-Scale Fullerene Detection and Analysis of High Temperature Nanocars

Andrew J. Osgood, Takashi Sasaki, James M. Tour, Kevin F. Kelly  
*Physical Review Letters*

### Flexibility in Oligo(phenylene ethynylene)-Fullerene derivatives

Andrew J. Osgood, Takashi Sasaki, James M. Tour, Kevin F. Kelly  
*ACS Nano*

## Select Presentations

American Physical Society March Meeting Denver, CO - March 2007

### The Smoluchowski Effect and the Step-Crossing Behavior of Nanocars

Andrew J. Osgood, T. Sasaki, Y. Shirai, J. M. Tour, K. F. Kelly

Rice Quantum Institute Colloquium Houston, TX - August 2006

### The Smoluchowski Effect and the Step-Edge Behavior of Nanocars

Andrew J. Osgood, T. Sasaki, Y. Shirai, J. M. Tour, K. F. Kelly

American Physical Society March Meeting Baltimore, MD - March 2006

### Imaging and Manipulation of Nanocars by Scanning Tunneling Microscopy

Andrew J. Osgood, T. Sasaki, Y. Shirai, J. M. Tour, K. F. Kelly

Nanoscale Design and System Integration (poster) Houston, TX - April 2005

### Fundamental Issues in Single Molecule Manipulation: Driving Nanocars



the myriad techniques, skill sets, disciplines, and nuances necessary to complete successful research in a top-level graduate program.