Alvin W. Orbaek
1904 Addison Rd Apt 4, Houston, TX 77030
(713) 851 2653 • al.whiteorbaek@gmail.com

Education

Rice University, Houston TX, USA	Ph.D. Chemistry (GPA: 4.08)	*2013*
	Master of Arts, Chemistry	*2010*
International Space University, Strasbourg, France	Certificate in Space Studies	*2006*
National University of Ireland Galway, Galway, Ireland	B.Sc. Experimental Physics	*2003*

Qualifications

I am a Ph.D. student in Chemistry who has a wide range of professional experience ranging from accounting, business and finance, people management, and research. In particular I have developed a host of specialized technical skills that are pertinent to physical sciences, and chemistry in particular. I am interested in solving problems, then finding and implementing solutions. I am willing to acquire skills if I do not already posses them. I am a good team player, and I have experience in managing people and resources. I am adept at focusing myself, and working independently when required. I am an enthusiastic person and aim to bring positivity to those around me, while at the same time carrying out my duties with integrity and humility.

Work Experience

Rice University, Houston TX *Nanotechnology Researcher* *2006-Present*

Advancing carbon nanotube materials by developing the synthesis, separation, and application towards the energy sector. I have several years experience with management of both people and resources for a variety of research projects, ranging from 3 months to several years. I also developed a laboratory exercise using silver nanoparticles that was adopted into the undergraduate curriculum at Rice University.

Teaching Assistant *2007-2009*

Provided pre-lab instruction and guidance to students during laboratory exercises & grading of lab reports.

Research Internship *2006-2007*

Awarded one of 12 positions in a countrywide government sponsored internship placing Irish students in top American nanotechnology institutes. Successfully completed SWNT synthesis, contributed to work that was later presented at ACS meeting.

CTAE, Barcelona, Spain *Junior Engineer* *2007*

Advising Galactic Suite team on the design of a Space Hotel, my tasks ranged from educating the customers about the physical space environment as well as the commercial constraints of a space-sector business; while also developing and designing the blue prints with an architecture firm.

Deloitte S_2G, Barcelona, Spain *Accounts Payable Assistant* *2003 – 2005*

Team leader of accounts payable team with four team members, for Hewlett-Packard APS, Denmark. I also acted as the financial records manager and the training coordinator for EMEA (Europe, Middle East, Africa) region. I am familiar with six-sigma training and practice.

Tin Pan Alley, San Antonio, Ibiza, Spain *DJ* *1997*

The Atlantic Hotel, Ballybunion, Co. Kerry, Ireland *DJ* *1995 – 1996*

Raidió Teilifís Éireann, Donnybrook, Co. Dublin, Ireland *Echo Island Correspondent* *1994*

National television correspondent for children's show Echo Island. Reported on local affairs and stories that were of interest.

US Patent Applications

- Magnetic particles for determining reservoir parameters. Serial Number 61/350,836.
- Analyzing the transport of plasmonic particles through mineral formations. Application Number PCT/US2011/038925.

Awards

- American Chemical Society, recognition of Project SEED work. *2011 and 2010*
- Nanotechnology Imagery contest. Smalley institute, Rice University. *2010*
- Harry B. Weiser award for excellence in teaching. *2009*

Skills & Training

- Communication skills through membership of T-Rex Toastmasters.
- Characterization techniques include but not limited to SEM, EDAX, AFM, TEM, HRTEM, STEM, TGA, XPS, Raman Spectroscopy, UV-vis Spectroscopy and FTIR Spectroscopy.
- Chemistry skills that employ inert gas techniques, schlenk line, dry-box, both solution and gas phase chemistry.
- Patent writing and communication of scientific concepts for the patenting of materials used for "down-hole" applications pertinent to the oil and gas industry.
- Entrepreneurship and Business Planning (12 week program) - Rice Alliance, Rice University, Houston, TX, USA.
- Technology Entrepreneurship Workshop (16 training hours) - Rice Alliance, Rice University, Houston, TX, USA.
- HAZMAT Harris County Fire Department HAZWOPER First Responder Awareness Training - Houston TX, USA.
- Advanced Excel Programming (16 training hrs) – Deloitte S_2G, Barcelona, Spain.
- Advanced Accounting (48 training hrs) – Deloitte S_2G, Barcelona, Spain.
- Accounting Basics (40 training hrs) – Deloitte S_2G, Barcelona, Spain.

Languages

English = Native speaker. *Spanish, Danish, and Catalan* = Conversational.

Peer-reviewed Publications

16. A high school classroom exercise using silver nanoparticles to test their anti-bacterial properties. Phillips, Mallam, **Alvin W. Orbaek**, Andrew R. Barron, J. Chem. Educ. (2013) *In preparation*.
15. Solution processed, ultra thin, free standing films of pristine carbon nanotubes as substrate for TEM imaging. Natnael Behabtu, **Alvin W. Orbaek**, Budhadipta Dan, Andrew R. Barron, Matteo Pasquali, J. Am. Chem. Soc. (2013) *In preparation*.
14. The Facile Synthesis of Multi Walled Carbon Nanotubes by Spray Pyrolysis. **Orbaek, Alvin**; Aggarwal, Neerja; Barron, Andrew, Carbon (2013) *In preparation*
13. What to learn from making Multi Walled Carbon Nanotubes. **Alvin W. Orbaek**, Neerja Aggarwal, Carmin Munoz-Lavenderos, Saba Sharafkhaneh and Andrew R. Barron, J. Chem. Educ. (2013) *In preparation*
12. Transition metal catalysts and the selective growth of single walled carbon nanotubes. **Orbaek, Alvin**; Crouse, Christopher; Barron, Andrew., Nanomaterials (2013) *In preparation*
11. Synthesis of bi-metallic transition metal nanoparticles. **Orbaek, Alvin**, Barron, Andrew, J. Mater. Chem. (2013) *In preparation*
10. Silver Nanotechnology as a Doorway to Science Education and Practice-Based Learning. **Orbaek, Alvin**; Phillips, Mallam; Hamerly, Ryan; Bodunrin, Lilian; Rivera, Erika; Frewer, Andrew; McHale, Mary; Barron, Andrew, J. Chem. Educ. (2013) *In press*

9. Towards a 'catalyst activity map' regarding the nucleation and growth of single walled carbon nanotubes. **Alvin W. Orbaek** and Andrew R. Barron, J. Exp. Nanosci. (2013) *In press*
8. Complications Pertaining to the Detection and Characterization of Individual and Embedded Single Walled Carbon Nanotubes by Scanning Electron Microscopy. **Alvin W. Orbaek** and Andrew R. Barron, Nanoscale (2012) *In press DOI:10.1039/C3NR00142C*
7. Length amplification of single walled carbon nanotubes for the enrichment of chiral specific nanotubes. **Orbaek, A. W.**; Barron, A. R., Nanotech (2012) 1, pp 330 - 333.
6. Overcoming "Coffee-Stain" Effect by Compositional Marangoni Flow Assisted Drop-Drying. Mainak Majumder, Clint S. Rendall, J Alexander Eukel, James Y.L. Wang, Natnael Behabtu, Cary Pint, Tzu-Yu Liu, **Alvin W. Orbaek**, Francesca Mirri, Jaewook Nam, Andrew R. Barron, Robert H. Hauge, Howard K. Schmidt, Matteo Pasquali. *J. Phys. Chem. B*, (2012) 116(22), pp 6536–6542.
5. Effect of carbon nanotube-fullerene hybrid additive on P3HT:PCBM bulk-heterojunction organic photovoltaics. Alley, Nigel J.; Liao, Kang-Shyang; Andreoli, Enrico; Dias, Sampath; Dillon, Eoghan P.; **Orbaek, Alvin W.**; Barron, Andrew R.; Byrne, Hugh J.; Curran, Seamus A. *Synthetic Metals* (2011), 162(1-2), pp 95-101.
4. Increasing the Efficiency of Single Walled Carbon Nanotube Amplification by Fe–Co Catalysts Through the Optimization of CH_4/H_2 Partial Pressures. **Orbaek, Alvin W.**; Owens, Andrew C.; Barron, Andrew R. *Nano Letters* (2011) 11(7), pp 2871-2874.
3. Dextran Coated Ultrafine Superparamagnetic Iron Oxide Nanoparticles: Compatibility with Common Fluorometric and Colorimetric Dyes. Griffiths, Sioned M.; Singh, Neenu; Jenkins, Gareth J. S.; Williams, Paul M.; **Orbaek, Alvin W.**; Barron, Andrew R.; Wright, Chris J.; Doak, Shareen H. *Anal. Chem.*, (2011), 83(10), pp 3778-3785.
2. Wet Catalyst-Support Films for Production of Vertically Aligned Carbon Nanotubes. Alvarez, Noe T.; Hamilton, Christopher E.; Pint, Cary L.; **Orbaek, Alvin**; Yao, Jun; Frosinini, Aldo L.; Barron, Andrew R.; Tour, James M.; Hauge, Robert H. *ACS Appl. Mater. Interfaces* (2010), 2(7), pp 1851-1856.
1. Dendrimer-Assisted Self-Assembled Monolayer of Iron Nanoparticles for Vertical Array Carbon Nanotube Growth. Alvarez, Noe T.; **Orbaek, Alvin**; Barron, Andrew R.; Tour, James M.; Hauge, Robert H. *ACS Appl. Mater. Interfaces* (2010), 2(1), pp 15-18.

Additional Publications

5. Michael L. Matson, **Alvin W. Orbaek**. *Inorganic Chemistry For Dummies*. Wiley LLC. (*Expected publication date June 2013*). Lead author for this book.
4. **Orbaek, A**.; McHale, M.; Barron, A. Silver Nanoparticles: A Case Study in Cutting Edge Research, *Connexions* http://cnx.org/content/m19597/1.11/, Aug 27, 2009
3. **Orbaek, A.**; Barron, A. ICP-AES Analysis of Nanoparticles, *Connexions* http://cnx.org/content/m22058/1.18/, Jul 7, 2009
2. The Happy Heart Cookbook. Self published work. 1991
1. Stories for Children. Sunday Spirits/The Telling Voice newspaper. 1992 - 1993

Oral Presentations

7. **Orbaek, Alvin W.**; Rivera, Erika; Hamerly, Ryan T.; Frewer, Andrew; McHale, Mary M.; Barron, Andrew R. Teaching the scientific process with silver nanotechnology. Abstracts, Joint 66th Southwest and 62nd Southeast *Regional Meeting of the American Chemical Society*, New Orleans, LA, United States, December 1-4 (2010)
6. **Orbaek, Alvin W.**; Owens, Andrew C.; Barron, Andrew R. Amplification of single walled carbon nanotubes as a route to achieving the armchair quantum wire. Abstracts, Joint 66th Southwest and 62nd Southeast *Regional Meeting of the American Chemical Society*, New Orleans, LA, United States, December 1-4 (2010)

5. **Orbaek, Alvin**; Phillips, Mallam Nkrumah. Using silver nanotechnology to teach chemistry in a high school curriculum. *STAT CAST Houston* (2010)
4. **Orbaek, Alvin W.**; Barron, Andrew R. Catalytic growth of single walled carbon nanotubes from catalyst nanoparticles. Abstracts of Papers, 239th *ACS National Meeting*, San Francisco, CA, United States, March 21-25 (2010)
3. **Orbaek, Alvin**; Phillips, Mallam Nkrumah; Nichol, Carolyn Aitken; McHale, Mary E. R.; Barron, Andrew R. Silver nanoparticle synthesis in a robust one-pot room temperature reaction. *ACS National Meeting*, Salt Lake City, March 22 – 26 (2009)
2. **Orbaek, Alvin**; Crouse, Christopher A.; Barron, Andrew R. Catalysis in SWNT growth. *ACS National Meeting*, Salt Lake City, March 22 – 26 (2009)
1. Colorado, Ramon; Crouse, Christopher A.; Gallaway, Clayton C.; **Orbaek, Alvin**; Barron, Andrew R. Substrate effects on the growth of single-walled carbon nanotubes (SWNTs) from iron complexes, clusters, and colloids on surfaces. Abstracts of Papers, 233rd *ACS National Meeting*, Chicago, IL, United States, March 25-29 (2007)

Invited Talks

2. **Orbaek, Alvin W.**; Behabtu, Natneal, Li Song, Horaz, Erik. Private meeting with Texas Rep. Congressman John Culberson (2010)
1. **Orbaek, Alvin W.** "Galactic Suite Space Hotel." National University of Limerick, Department of Mathematics (2007).

Poster Presentations

8. **Alvin Orbaek**, Wade Adams, Andrew Barron, Pulickel Ajayan, Robert Hauge, Junichiro Kono, Matteo Pasquali, James Tour, Michael Wong, Boris Yakobson. The Armchair Quantum Wire. *Nanotechnology for Defense* Washington (2011)
7. Owens, Andrew C.; **Orbaek, Alvin W.**; Barron, Andrew R. Ensemble characterization of carbon nanotube growth from various metal catalysts. Abstracts, Joint 66th Southwest and 62nd Southeast *Regional Meeting of the American Chemical Society*, New Orleans, LA, United States, December 1-4 (2010)
6. **Alvin W. Orbaek**, Andrew C. Owens, and Andrew R. Barron, Ensemble Characterization of Carbon Nanotube Growth from Various Metal Catalysts. Presented at the 25th Anniversary of the Buckyball discovery, October (2010)
5. **Orbaek, Alvin W.**; Crouse, Christopher C.; Barron, Andrew R. Transition metals and growth of single walled carbon nanotubes. *North American Catalysis Society* poster presentation. Rice University. April 27 (2009)
4. **Orbaek, Alvin W.** Nanoparticle Metals effect on SWNT growth. *Presentation to Rep. Congressman John Culberson*, Rice University. Houston TX. February 18 (2009)
3. **Orbaek, Alvin W.**; Crouse, Christopher C.; Barron, Andrew R. Nanoparticles for Nanotubes. 64th Southwest *Regional Meeting of the American Chemical Society* poster presentation, Little Rock, AR, United States, October 1-4 (2008), SWRM-423.
2. **Orbaek, Alvin W.**; Owen, Andrew C.; Barron, Andrew R. Nanoparticle metals effect SWNT growth. *Air Force Nanotube Collaborator* meeting posters presentation. Dayton OH. October (2008)
1. **Orbaek, Alvin W.**; Barron, Andrew R. SWNT-Cat chemistry from wet to dry chemistry. *Air Force Nanotube Collaborator* meeting poster presentation. Dayton OH. November (2007)

Academic Service

Rice University, Houston TX

CBEN Outreach officer *2010–2011*

Coordinated and planned numerous outreach activities in the greater Houston area. In particular partook in a number of events related to Nanodays at the Children's Museum of Science. Presented to several groups of high school teachers to demystify nanotechnology enabling them to explain the subject in their classrooms. Coordinated outreach prospects throughout campus and off campus opportunities. Invited guest speaker Prof. Cyrus Moody to discuss ethics in science, and the interdisciplinary nature of science and nanotechnology. Assisted with regular bi-weekly meetings.

Project SEED mentorship *2009 - 2011*
Summer research program developed by American Chemical Society to encourage underprivileged and minority students to work in the chemistry lab. Have taught two students each summer for an eight week summer period, for three consecutive years. Projects ranged from silver nanoparticle synthesis and application toward Protein Crystallization, and Diels-Alder catalysis using silver nanoparticles. Students were taught to make nanoparticles, and then they were given individual projects such that they can engage in the research atmosphere by taking control of their own respective research project.

Silver nanoparticle undergraduate general chemistry curriculum *2008-2011*
Created lab protocol to teach and demonstrate chemistry through the use of silver nanoparticle synthesis. Module was incorporated into teaching curriculum for three consecutive years, teaching 1000+ students with a success rate greater than 80%.

Teaching Assistant *2007-2010*
Provided pre-lab instruction, guided students in the laboratory, and graded lab reports for the Freshman Chemistry course. Work included setting pop quizzes, delivering pre-lab presentation and discussion. Supervision of students (30), demonstration of laboratory exercise and maintenance of safe working environment.

Teacher's Nano-Workshop Instructor *2008-2009*
Discussed, demonstrated and supervised the synthesis of nanomaterials including ferrofluid, liquid crystals, and my own course based on the synthesis of silver nanoparticles.

CBEN Summer Academy Instructor *2007 - 2009*
Instructed 25 high school students in a research project including fieldwork, laboratory analysis, and interpretation of results for the Center for Biological and Environmental Nanotechnology, under the guidance of Prof. Mary McHale.

REU instructor for module on "Ethics in Research" *2008*
Prepared class materials and led discussion with 12 REU summer students on the ethical aspect of scientific research. This was taught in conjunction with Prof. Cyrus Moody, and Prof. John Hutchinson. Teaching period consisted of 8 weeks.

Mentoring of High School Teacher *2008*
Spent one summer teaching a high school teacher to make silver nanoparticles. Assisted teacher to develop teaching protocol for use in their respective class.

Mentoring of individual students

- Neerja Aggarwal. Research related to synthesis of carbon nanomaterials. Her project was accepted to the Intel International Science Fair 2011 & 2012. She won 3rd prize in chemistry in 2012. *2010 to present*
- Saba Sharafkhaneh. MWNT synthesis. *2011 - 2012*

- Nanotube Separations. Managed team of five students in a project involving the separation of single walled carbon nanotubes. Project lasted for a period of 9 weeks. *2011*
- Andrew Frewer. Research the use of silver nanoparticles with respect to the physics of light-matter interaction and shape control. *May – July 2010*

Deloitte S_2G, Barcelona, Spain

Dedicated Training Instructor, Wroclaw, Poland *2005*

Upon migration of tasks to Poland it was my responsibility to develop curriculum to train and test new recruits working in Poland. In this role I spent several months conducting online training by use of NetMeeting. Towards the end of the migration I then spend three weeks in Poland training over 50 employees of Hewlett-Packard.

Training Coordinator *2003-2005*

Responsibility for training employees regarding tasks related to Accounts Payable. This required detailed knowledge of country specific accounting practices for the EMEA (Europe, middle east, Middle East and Africa) regions.

National University of Ireland Galway, Galway, Ireland

Teaching Assistant *2003*

Assisted with teaching and demonstration of laboratory exercises taught to second year college students of the Department of Physics.

Outreach Activities

University of Saint Tomas *November 2011*

Taught two one-hour 'Silver Nanotechnology' classes at the University of Saint Thomas.

Dulles High School. *August 2011*

Taught one silver nanotechnology extra credit course for summer school students of Dulles high school.

Hightower High School *2010 - 2011*

Taught silver nanotechnology class to students at Hightower high school.

Children's Museum of Houston *2009 - 2011*

I presented a guest lecture on advancements of Nanotechnology to a group of high school teachers. Additionally I have been heavily involved with Nanodays, and Machine factory, two outreach initiatives run by the museum in which I coordinated efforts in conjunction with CBEN. I also partook in "nanotechnology pantomime" with Prof Douglas Natelson, and then led a questions and answers session with audience about the advent of nanotechnology.

Sally Ride Science Fair *August 2010*

Led tours of Rice University campus, for visiting female high school students, through laboratory spaces highlighting the Buckyball history and significance of Rice University in the history of chemistry and science.

Selected News and Press Release Items

11. "Barron lab intern repeats win at Houston science fair"
    http://news.rice.edu/2012/03/27/barron-lab-intern-repeats-win-at-houston-science-fair/
10. Rice Graduate Student Association and Student Association research mixer

http://www.media.rice.edu/media/NewsBot.asp?MODE=VIEW&ID=16245

9. "Looking at Energy Future with Nanotechnology"
   http://www.myfoxhouston.com/dpp/news/local/110714-looking-at-energy-future-with-nanotechnology
8. "'Amplified' nanotubes may power the future"
   http://news.rice.edu/2011/07/14/amplified-nanotubes-may-power-the-future/
7. "Road safety system drives Irish team to tech success"
   http://www.irishexaminer.com/world/kfgbkfkfidcw/rss2/
6. "Barron Lab helps high schooler earn top science prize"
   http://www.media.rice.edu/media/NewsBot.asp?MODE=VIEW&ID=15678
5. "The Way I See It: SEEDs of success. High schoolers get a taste of real science during summer in Rice nano lab"
   http://www.media.rice.edu/media/NewsBot.asp?MODE=VIEW&ID=14619
4. "Summer school supreme. High schoolers don lab gear for Project SEED at Rice"
   http://www.media.rice.edu/media/NewsBot.asp?MODE=VIEW&ID=12769
3. "10 questions for...Alvin White Orbaek"
   http://www.rte.ie/news/2007/0830/orbaeka.html
2. "Pint of the 'black stuff' to breach the final frontier"
   http://www.independent.ie/national-news/pint-of-the-black-stuff-to-breach-the-final-frontier-1066313.html
1. "We're all going on a space holiday . . . if you've got 2.9m to spare"
   http://tribune.maithu.com/article/2007/aug/19/were-all-going-on-a-space-holiday-if-youve-got-29m/

Selected Videos and Online Presentations

- Armchair Quantum Wire By Using Amplification of Nanotubes - Alvin Orbaek
  - http://vimeo.com/20804491
- Chemistry with Alvin. Welcome to the Barron Group at Rice University
  - http://barron.rice.edu/aok_qtime.htm

Extra Curricular Activities / Interests

I particularly enjoy books on subjects such as history, economics, politics, as well as the Classics, and of science and technology manuscripts. I enjoy sports such as Aikido, soccer, sailing and swimming. I have competed at several local regattas and I try to get out on the water as often as possible. I also used to play soccer where I represented county Clare, Ireland, under 16's. I appreciate music greatly so I turned to Dj'ing in order to pay for my record and vinyl collection.

References

Prof. Andrew R. Barron
Charles W. Duncan, Jr. - Welch Chair of Chemistry and Professor of Materials Science
Department of Chemistry
Rice University, MS-60
6100 Main Street
Houston, TX, 77005
Phone: 713 348 5610

Christopher E. Hamilton, Ph.D.
Research Scientist

MST-7: Polymers & Coatings Group
Materials Science & Technology Division
Los Alamos National Laboratory, MS E549
Los Alamos NM 87545
Office: 505-606-0632
Mobile: 505-695-5486
FAX: 505-667-8109
Pager: 505-664-2456
E-mail: chamilton@lanl.gov