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Core Infrastructure Services, Information Technology Services, Syracuse University
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RESEARCH DESCRIPTION (Publication Summary and Current Research)

Computational quantum chemistry; molecular nanotechnology; the design and simulation of molecules and nanostructures; molecular-based materials for molecular electronics and nonlinear optical materials applications; nanostructures from molecular building blocks and biomimetic principles; mechanosynthetic approaches in advanced molecular manufacturing; the property prediction of solid-state materials from density functional theoretical approaches; inelastic neutron scattering vibrational spectroscopy theory and calculation; computational drug design and modeling interaction pathways; molecular modeling, vibrational properties, and predictive modeling tools for crystal polymorphism; the simulation of internal/external vibrations and conformational changes observed by terahertz (THz) spectroscopy; electronic structure theory of inorganic clusters and organometallic coordination complexes; molecular dynamics simulations and reduced model development of DNA-based nanostructures; computational design principles, property prediction and evaluation in bioconjugate chemistry; molecular mechanics/dynamics force field development; extensive background in computer hardware and software, including systems design, administration, security, cluster assembly, maintenance, parallel computing platforms, national computing facility utilization (NCSA), distributed computing and cloud-computing (amazon web services, penguin-on-demand) services, graphics design, web development, python, science writing, science outreach.

EDUCATION

Syracuse University (Aug 1998 – Oct 2004), Syracuse, New York, USA

Graduate Fellow, Doctor of Philosophy, Physical Inorganic/Computational Quantum Chemistry

Thesis: **Computational Quantum Chemistry In Initial Designs And Final Analyses**

Thesis Defense: October 15, 2004, 30 GPA credits, summa cum laude

Advisor: Bruce S. Hudson, Ph.D. (2001-2004)

The comparison of theory and experiment in the inelastic neutron scattering vibrational structure of multi-molecular systems and periodic molecular arrays (crystals), focusing on hydrogen-bonded networks and organic crystal engineering; the application of periodic density functional theory to the study of electronic structure in the solid state, including molecular crystals, periodic lattices, molecular density-of-states, and polymorphism/crystal structure prediction.

Advisor: James T. Spencer, Ph.D. (1998-2004)

Molecular building block and biomimetic approaches to nanostructure design and fabrication; electronic structure theory of main group (borane and carborane) clusters, emphasizing their interactions with organic species for molecular electronics and nonlinear optical materials applications.

Departmental Research: Jon Zubieta, Ph.D. and Karin Ruhlandt, Ph.D. (2002-2004)

Theory and modeling of isomerization/rearrangement pathways of solid-state materials formed via the hydrothermal-based inorganic-organic hybrid chemistry of inorganic oxides, with specific focus on the octamolybdate class of isomers (Zubieta); computational molecular biology and transition metal radiopharmaceutical drug design via classical Molecular Mechanics/Molecular Dynamics simulations

(Zubieta, Molecular Insight, Inc.); quantum chemical studies of structure and stability among the heavy alkali organometallic complexes with emphasis on the elucidation of crystal morphology from quantum chemical approaches (Ruhlandt).

Syracuse University (Aug 1994 – May 1998), Syracuse, New York, USA
Bachelor of Science with Honors, Chemistry, May 1998, *magna cum laude*, 156/120 credits

SELECTED CONTENT, HONORS AND ORGANIZATIONS

Invited Essays, Interviews, Slidecasts, Free Press, Writings, Talks

Contributing Writer: Allis D.G. "Mars Rovers: From Sojourner To Perseverance - Perseverance" – Free Astronomy Magazine, www.astropublishing.com, March-April 2021 2021.

Contributing Writer: Allis D.G. "OSIRIS-REx Set To Return A Feather From Bennu" – Free Astronomy Magazine, www.astropublishing.com, January-February 2021.

Contributing Writer: Allis D.G. "Small Molecules, Big Questions – The Detection Of Venusian Phosphine" – Free Astronomy Magazine, www.astropublishing.com, November-December 2020.

Contributing Writer: Allis D.G. "Amateur Astronomy And Outreach – A Local Perspective" – Free Astronomy Magazine, www.astropublishing.com, March-April 2020.

NASA-SSA, Public Lecture: Allis D.G. "Walking On The Moon - The 50th Anniversary Of (Arguably) The Greatest Year In Space (So Far)" – (1) Hamlin Public Library, Hamlin, NY, 1 August 2019 (youth), (2) Mendon Public Library, Honeoye Falls, NY, 5 August 2019 (youth), (3) Victor Farmington Library, Victor, NY, 6 August 2019 (youth), (4) Hamlin Public Library, Hamlin, NY, 8 August 2019 (adult).

Contributing Writer: Allis D.G. "A Possible Subglacial Lake On Mars" – Free Astronomy Magazine, www.astropublishing.com, September-October 2018.

NASA-SSA, Public Lecture: Allis D.G. "The Year In Space 2018 – Things That Keep Some Of Us Up At Night" – Science Exploration Day 2018, CWS-STANYS, St. John Fisher College, Rochester, NY, 18 May 2018.

NASA-SSA, Public Lecture: Allis D.G. "Planet Nine From Outer Space" – Liverpool Public Library, Liverpool, NY, 19 April 2018.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In April: The Lyrid Meteor Shower" - newyorkupstate.com, syracuse.com, 2 April 2018.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In March: Two Full Moons, Venus And Mercury After Sunset" - newyorkupstate.com, syracuse.com, 1 March 2018.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In February: Morning Planets And Early Notice Of A Doomed Space Station" - newyorkupstate.com, syracuse.com, 1 February 2018.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In January: Supermoon, Quadrantids By Moonlight, Uranus By Binoculars" - newyorkupstate.com, syracuse.com, 1 January 2018.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In December: The Geminid And Ursid Meteor Showers Close Out The Observing Year" - newyorkupstate.com, syracuse.com, 30 November 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In November: The Leonid Meteor Shower Takes The Stage" - newyorkupstate.com, syracuse.com, 1 November 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In October: The Orionids, International Observe The Moon Night" - newyorkupstate.com, syracuse.com, 1 October 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In September: Cassini's End And Morning Planet Delights" - newyorkupstate.com, syracuse.com, 1 September 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: What To See In The Night Skies August 18 to August 25" - newyorkupstate.com, syracuse.com, 18 August 2017.

NASA-SSA, Inaugural Public Lecture: Allis D.G. "The Great American Eclipse (2017)" – Skaneateles Public Library, Skaneateles, NY, 21 August 2017; NOPL North Syracuse, North Syracuse, NY, 14 August 2017; Cazenovia Public Library, Cazenovia, NY, 16 August 2017; Community Library of DeWitt and Jamesville, Jamesville, NY, 21 August 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: Where To Find Solar Eclipse Parties" - newyorkupstate.com, syracuse.com, 11 August 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: What To See In The Night Skies August 4 To August 11" - newyorkupstate.com, syracuse.com, 4 August 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: What To See In The Night Skies July 28 To August 4" - newyorkupstate.com, syracuse.com, 28 July 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: What To See In The Night Skies July 21 To July 28" - newyorkupstate.com, syracuse.com, 21 July 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: What To See In The Night Skies July 14 To July 21" - newyorkupstate.com, syracuse.com, 14 July 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: What To See In The Night Skies July 7 To July 14" - newyorkupstate.com, syracuse.com, 7 July 2017.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY: What To See In The Night Skies June 30 o July 7" - newyorkupstate.com, syracuse.com, 30 June 2017.

Contributing Writer: Allis D.G. "June Stargazing In Upstate NY: What To Look For In The Skies This Month" - newyorkupstate.com, syracuse.com, 1 June 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In May: A Meteor Shower And Preparations For The Solar Eclipse" - newyorkupstate.com, syracuse.com, 31 April 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In April: Comet Hunting And The Lyrid Meteor Shower" - newyorkupstate.com, syracuse.com, 31 March 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In March: Messier Marathon And The Lunar Occultation Of Aldebaran" - newyorkupstate.com, syracuse.com, 1 March 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In February: Lunar Eclipse, Kopernik Star Party, 'Dog Nights Of Winter'" - newyorkupstate.com, syracuse.com, 1 February 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In January: Quadrantid Meteors And Winter's Best Early Evenings" - newyorkupstate.com, syracuse.com, 3 January 2017.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In December: Geminid Meteor Shower, Another Supermoon" - newyorkupstate.com, syracuse.com, 2 December 2016.

Contributing Writer: Allis D.G. "November Stargazing In Upstate NY: Catch The Sometimes Roaring Leonids" - newyorkupstate.com, syracuse.com, 31 October 2016.

NASA-SSA, Inaugural Lecture: Allis D.G. "International Observe The Moon Night" - Technology Alliance of Central New York and Milton J. Rubenstein Museum of Science & Technology Sweet Science Series Inaugural Lecture, Syracuse, NY, 8 October 2016.

NASA-SSA, Keynote Lecture: Allis D.G. "Gravitational Waves – A New Way to Know the Universe" - Kopernik AstroFest 2016, Kopernik Astronomical Society, Vestal, NY, 8 October 2016.

Contributing Writer: Allis D.G. "Upstate NY Stargazing In October: Prominent Constellations Of summer And Winter Visible On Autumn Nights" - newyorkupstate.com, syracuse.com, 3 October 2016.

NASA-SSA, Public Lecture: Allis D.G. "Black Holes & Gravitational Waves" – Liverpool Public Library, Liverpool, NY, 22 September 2016.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY In September: Look For More Subtle Objects On Autumn Nights" - newyorkupstate.com, syracuse.com, 6 September 2016.

Contributing Writer: Allis D.G. "Stargazing In Upstate NY In August: See The Milky Way, Perseid Meteor Shower" - newyorkupstate.com, syracuse.com, 1 August 2016.

Contributing Writer: Allis D.G. "Night Sky-Gazing In Upstate NY: What To Look For In July" - newyorkupstate.com, syracuse.com, 7 July 2016.

NASA-SSA, Presenter: Allis D.G. TACNY Maker Hall at the Dr. King Community Day, Syracuse City School District, Syracuse, NY, 30 January 2016.

NASA-SSA, Public Lecture: Allis D.G. "A Big Year For Dwarf Planets: Highlights Of The NASA Missions To Ceres & Pluto" – Liverpool Public Library, Liverpool, NY, 23 November 2015; Central New York Skeptics, DeWitt, NY, 20 January 2016.

NASA-SSA, Public Lecture: Allis D.G. "Citizen Science, A Bit O'Hubble, And Whatever Comes Up" - CNY Technology User Group, Liverpool Public Library, Liverpool, NY 7 December 2015.

Contributing Author: Allis D.G. "Stu's Last Lesson" - Focal Point, Sky & Telescope Magazine, December, 2014.

NASA-SSA, Presenter: Allis D.G. Ying-TRSEF Summer Development and Onondaga Community College "Summer Of Science" Program, Carthage High School, Carthage, NY, 7 August 2014.

NASA-SSA, Presenter: Allis D.G. STEM Careers Day and Leadership Forum, Partners for Education & Business, National Grid, CNY Stem Hub, and SRC, Syracuse, NY 10 April 2014.

NASA-SSA, Presenter: Allis D.G. and Goodson R., ing TRSEF 2nd NASA Mini Maker Faire 2014, Onondaga Community College, Syracuse, NY, 22 March 2014.

NASA-SSA, Presenter: Allis D.G. and Goodson R., Dr. King Weekend Mini Maker Faire CNY 2014, Le Moyne College, Syracuse, NY 18 January 2014.

Feature Article (Cover): Allis D.G. "The 16-inch f/4.5 Collapsible-Truss Dobsonian From New Moon Telescopes: New Design Approaches and Old-Fashioned Craftsmanship" - Astronomy Technology Today, May-June 2013 (Vol. 7, Issue 3).

Invited Lecture: Allis D.G. "There's Plenty Marooned At The Bottom – The Possibilities And Politics Of Molecular Manufacturing" - SRC, Inc., Syracuse, NY 25 January 2013.

Public Lecture: Allis D.G. "A Most Unlikely Obvious Molecule – DNA And Its Consequences" - Central New York Skeptics, DeWitt Public Library, DeWitt, NY, 7 November 2012.

Public Lecture: Allis D.G. "Controversy In Science" - Central New York Skeptics, DeWitt, NY, 18 January 2012.

Invited Lecture: Allis D.G. "When Mechanical Engineering and Quantum Mechanics Meet - Using Computational Chemistry to Predict a Future for Molecular Manufacturing" - A*STAR - Institute of Materials Research and Engineering (IMRE) Workshop on Atom Technology and its Applications, Singapore, 10 June 2010.

Invited Lecture: Allis D.G. "I Want A New (Vitamin B12-Based Bioconjugate Approach To Deliver A) Drug" and "Single Atom Manipulation And The Chemistry Of Mechanosynthesis" - Syracuse University Project Advance Spring Meeting, Syracuse, NY, 27 April 2010 and Lubin House, New York City, NY, 13 May 2010.

Interview: "Syracuse University Partners With Serum Institute Of India To Develop Vaccines For Children" - Syracuse University Arts and Sciences Press Release, 2008.

Slidecast: Allis D.G. "Single-Atom Manipulation and the Chemistry of Mechanosynthesis" - NanoScienceWorks, Taylor & Francis Publishers (www.nanoscienceworks.org/slidecast), December, 2007.

Guest Essay: Allis D.G. "Exploring the Productive Nanosystems Roadmap" - Center for Responsible Nanotechnology Newsletter (www.crnano.org), October, 2007.

Interview: "Solid-State Modeling of the Terahertz Spectrum of the Explosive HMX" - Accelrys case study (www.accelrys.com), August, 2006.

Interview: Olson S. "An Interview with Damian Gregory Allis" - for Nanotech.biz (www.nanotech.biz), November, 2005.

Interview: Caponi K.A. "Towards Computing Crystal Forms" - Access Magazine, National Center for Supercomputing Applications, Vo. 17, No. 1, Spring 2004.

Invited Lecture: Allis D.G. "Single Atom Manipulation and the Chemistry of Mechanosynthesis" - Productive Nanosystems: Launching the Technology Roadmap, Arlington, VA, USA 9-10 October 2007.

Invited Lecture: Allis D.G. "Chemical Origins of Solid-State Terahertz Spectra" - DIA/NGA Community Academic Summit, Williamsburg VA 11-13 June 2007.

Lecture: Allis D.G. "Novel Imaging and Spectroscopy Technologies - Terahertz Detector Device Deployment and Theory for Terahertz Biomolecular And Molecular Threat Agent Spectroscopy" - IC Postdoctoral Research Fellowship Colloquium, Chantilly, VA, 30 April – 3 May 2007.

Invited Lecture: Allis D.G. "Nanosystem Simulation and Design for Molecular Manufacturing" - Department of Mechanical and Aeronautical Engineering, Clarkson University, Potsdam, NY, 27 February 2007.

Keynote Lecture: Allis D.G. "Nanotechnology and Molecular Manufacturing" - Ibero-American Conference for University and College Presidents: Global Workforce Trends and Emerging Technologies, Advanced Technology Center ATC, Alamo Community College District, San Antonio, Texas, 18-20 September 2006.

Invited Lecture: Allis D.G. "Computational Chemistry for the Next 6 Months and 50 (or so) Years: Quantum Theory Applications in Homeland Security and Molecular Manufacturing" - Syracuse University Project Advance Spring Meeting, Syracuse, NY, 22 March 2006 and Lubin House, New York City, NY, 27 May 2006.

Lecture: Allis D.G. "The Design of Carbon Nanotube-Based Dative Structures from Supramolecular Principles" - Foresight Institute Tenth Conference on Nanotechnology, Bethesda, MD, 10-12 October 2002.

Invited Lecture: Allis D.G. "An Introduction to Computer Aided Chemistry and Nanomechanical Design Using CAChe" - Syracuse University Project Advance Spring Meeting, Lubin House, New York City, NY, 18-19 May 2000.

Selected Honors

NASA Solar System Ambassador (2014-), Director of Central Intelligence Postdoctoral Research Fellow (2005-2007), Marquis Who's Who (in the World, in Science and Engineering, and in America), Foresight Institute Distinguished Student Award in Nanotechnology (2004), Syracuse University All-University Graduate Fellowship (1998-2001, three year appointment), Who's Who Among Students in America's Colleges and Universities (1998), Phi Beta Kappa (1998), Syracuse University Merck Index Award (1998), Golden Key National Honors Society (1996), Phi Eta Sigma (1995), Syracuse University Honors Program (1994-8), Syracuse University Dean's Scholar (1994-8, all semesters), John Philip Sousa Award (Jamesville-DeWitt School District, 1994).

Graphics In-Print (Excluding Web Content)

Chemistry of Materials (Cover, Vol. 32, Iss. 5, 10 March 2020), Star Maps: History, Artistry, and Cartography, 3rd Ed. (Contribution, p. 461, 2019), Angewandte Chemie (Inside Cover, Vol. 55, Iss. 24, 6 June 2016), Journal of Physical Organic Chemistry (Cover, Vol. 27, Iss. 3, March 2014), ChemMedChem (Back Cover, April 2013), Future Medicinal Chemistry (Content, Vol. 5 No. 17, 2013), MedChemComm (Cover, Iss. 9, September 2012), Journal Of Physical Chemistry A (Cover, Vol. 114, No. 44, November 2010), Molecular Biosystems (Inside Cover, Vol. 6, No. 9, September 2010), Journal of Organic Chemistry (Cover, Vol. 75, No. 7, April 2010), Clinical Chemistry (Cover, Vol. 54, No. 1, January 2008), ChemMedChem (Cover, Vol. 4, Iss. 3, March 2009), ChemMedChem (Cover, Vol. 2, Iss. 12, December 2007), Technology Roadmap for Productive Nanosystems (Content, 2008), The Future for Nanoscience and Nanotechnology, RSC and IOP (Content, 2008), Productive Nanosystems: Launching the Technology Roadmap (Cover, 2007), "Erlebnis Wissenschaft" Wiley-VCH Book Series (Content, 2007), Nanotechnologien für die Optische Industrie, www.hessen-nanotech.de (Content, 2007), Großes Netzwerk für Kleine Teilchen Aerosolforschungin der GSF (Content, 2007), Accelrys Chemical Case Study (Content, 2006), Tennessee's Business (Cover and Content, Vol. 15, 2006), Revista Latitude (Content, 2006), Nanoaventura, Museu Exploratorio de Ciencias de Campinas, Instituto Sangari, (Content, 2005).

Albums and Recordings

The Methodist Bells, 2018 - "Esso"; Excelsior Cornet Band, 2006 - "Cheer Boys, Cheer!"; John Bartles, 2007 - "John Bartles Presents Topless and Bottomless"; Jolie Rickman, 1998 - "Sublime Detonation"; Tjaden, 1998 - "November Scrawl"

Affiliations, Organizations, Professional Activities

Buffalo Astronomical Association (member, 2020-), The Association Of Lunar And Planetary Observers (member, 2019-), International Journal of High School Research (contributing editor, 2018-), Astrofilo/Free Astronomy Magazine (contributing editor, contributing author 2018-), Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy (reviewer, 2017-), Inorganica Chimica Acta (reviewer, 2017-), Crystal Growth and Design (reviewer, 2017-), Astronomical League (member-at-large, 2016-), Ying Tri Region Science & Engineering Fair (judge, 2013, 2014, 2015), CNY Observers & Observing (executive director, lecturer 2013-2020), Preservation Association of Central New York (member, webmaster 2013-2017), Astronomy Section: Rochester Academy of Sciences (member, 2013-), Syracuse Innovators Guild (member, 2013-2015), Union of Concerned Scientists (member, 2013-), Hacks/Hackers Syracuse (member, 2012-2015), Kopernik Observatory and Science Center/Kopernik Astronomical Society (member, 2011-), Chinese Optics Letters (Reviewer, 2011-), Journal of Molecular Structure (reviewer, 2010-), Materials Chemistry and Physics (reviewer, 2009-), Neutron Scattering Society Of America (member, 2009-), Lifeboat Foundation (nanotechnology and chemistry advisory board member, 2007-), International Society of Nanoscale Science, Computation, and Engineering (Member 2007-), Technology Alliance of Central New York (TACNY, organizational affiliate, member 2007-), Chemical Physics Letters (reviewer, 2007-), Technology Roadmap for Productive Nanosystems (contributing editor, contributing author, and working group member, 2005-2007), Inorganic Chemistry Communications (reviewer, 2005-), Molecular Engineering Research Institute (member, 2004-2008), Syracuse Astronomical Society (board of directors, 2003-2012 and president, 2007-2012), American Association for the Advancement of Science (member, 1997-), The Foresight Institute (member, 1997-), The Planetary Society (member, 1996-), American Chemical Society (member, 1995-).

CURRENT RESEARCH AND PROFESSIONAL POSITION

Free Astronomy Magazine, www.astropublishing.com, Iseo, Italy (2018-)
Contributing English Language Editor, Contributing Author

Information Technology Services, Syracuse University, Syracuse, New York, USA (2015-)
Core Infrastructure Services, High Throughput and Virtual Environment Computing Support Scientist

Forensic And National Security Sciences Institute, Syracuse, New York, USA (2012-)
Research Fellow, Biological and Threat Agent Modeling and Simulation

Syracuse University, Syracuse, New York, USA (2007-)
Research Assistant Professor, Department of Chemistry, Departmental and External Collaborative Computational Chemistry Research

Nanofactory Collaboration, www.molecularassembler.com/Nanofactory/ (2006-)
Independent Research, Multiple Ongoing Academic and Industrial Research Projects

SELECTED PAST RESEARCH AND PROFESSIONAL POSITIONS

AptaMatrix, Inc. (formerly Orthosystems, Inc.), Syracuse, New York, USA (2010-2018)
Bioinformatics, Computational Modeling and Web Development

Contributing Writer, **Syracuse Media Group**, Syracuse, New York, USA (2016-2018)
"Upstate New York Stargazing," Monthly Astronomy Writer, newyorkupstate.com and syracuse.com

Nanorex, Inc., www.nanorex.com, Bloomfield Hills, Michigan, USA (2004-2008)
Senior Scientist and former Scientific Advisory Board Member

- Molecular CAD-based structural DNA nanotechnology software design and force field development
- Quantum/classical nanostructure modeling and software design tools for molecular manufacturing
- nanoEngineer-1 v1.0.0, 2008 winner, Products Category, Nanotech Briefs "Nano50"

Nanohive@HOME, www.nanohive-1.org (February – May, 2007, defunct 2008)

Project Developer, Scientific Advisor, and Content Provider

- BOINC-based distributed computing system (developed by Brian Helfrich) for nanoscale simulations
- General quantum/classical simulation tool for conformational and structural rearrangement searches
- Tooltip Failure Mode Search Project peaked at an unadvertised 3 teraFLOPS (see paper Ref. 42)

Molecular Insight Pharmaceuticals, Inc., Cambridge, Massachusetts, USA (2003-2007)

Consultation Position in Computational Radiopharmaceutical Design, www.molecularinsight.com

- Biomolecular modeling and molecular dynamics simulations of novel synthetic radiopharma targets
- Involved in target planning sessions and responsible for AMBER/GROMOS force field development
- First design study (biotin-based analogues for ReCO₃ complexation) is paper Ref. 14 (Bioconj. Chem.)

ICPDRFP/CIA, Washington, D.C. (September 2005 - September 2007, 2 Year Appointment)

Director of Central Intelligence Postdoctoral Research Fellow with Dr. Timothy Korter

- Theory and modeling of molecular phenomena observed in solid-state terahertz (THz) spectroscopy
- Several papers and presentations relevant to threat agent/drug identification and polymorphism
- First publication (Paper Ref. 12) highlighted in Science and Chemical and Engineering News

Nanoworks Incorporated, Fayetteville, New York, USA (1999-2002)

Senior Theoretician, Nanosystems Design and Simulation, Photonic and Thin Film Materials

- Principle Investigator for BMDO 2000 Phase I SBIR: Optical Computing & Optical Signal Processing
- Theory and design of novel nonlinear optical materials for use in optical-based technologies
- Molecular modeling studies served as the basis for experimental work described in Patents (see below) and several publications and presentations

Department of Chemistry, Syracuse University, Syracuse, New York, USA (1996-8)

Undergraduate Researcher, Research Experience for Undergraduates (REU)

- Photolytic studies of borane clusters and aromatic systems by experimental and theoretical methods
- Theoretical studies of the photoisomerization chemistry of rhodium- and manganese- boranes

Syracuse Research Corporation/VA Hospital, Syracuse, New York, USA (1995-7)

Biological Sciences Student Trainee, Laboratory Technician for Brad C. Motter, Ph.D.

- Responsible for the design and fabrication of multi-channel tetrode hyperdrives, used chronically in the recording of activity in the mammalian cerebellum V1, V2, and V4 regions
- Surgical assistant, computer interface and protocols developer for device data collection

Northeast Parallel Architectures Center, Syracuse, New York, USA (1994-7)

Internet and Database Development for www.csir.org (website defunct, 2001)

- Responsible for processing and cataloging of software submissions for Chemistry Software and Information Resources (www.csir.org), an online chemistry software information database.
- Developed new GUI and HTML protocols to work with the new site requirements, including the restructuring of the existing databases for IEEE compliance.

PUBLICATIONS (Peer-Reviewed Only)

52. Dincă, S., Allis, D.G., Moskowitz, M., Sponsler, M.B., and Hudson, B.S. "Preparation of ordered polyacetylene by solid-state polymerization in nanoscale confinement." *Chemistry of Materials*, 32 (2020), 5, 1769-1783. DOI: 10.1021/acs.chemmater.9b03644, including Cover Art.

51. Hogg T., Moses M.S., and Allis D.G. "Evaluating the friction of rotary joints in molecular machines." *Molecular Systems Design & Engineering*, 2 (2017) 3, 235-252. DOI:10.1002/cmdc.201600073, arxiv.org/abs/1701.08202.

50. Henry K.E., Kerwood D.J., Allis D.G., Workinger J.L., Bonaccorso R.L., Holz G.G., Roth C.L., Zubieta J., and Doyle R.P. "Solution structure and constrained molecular dynamics study of vitamin B12

conjugates of the anorectic peptide PYY(3-36)." *ChemMedChem*, 11 (2016), 9, 1015-102, DOI: 10.1002/cmdc.201600073, PDB Entry: 2NA5.

49. Bonnard G., Barrès A.-L., Danten, Y., Allis D.G., Mentré O., Tomerini D., Gatti C., Izgorodina E. I., Poizot P., and Frayret C. "Experimental and theoretical studies of tetramethoxy-p-benzoquinone: infrared spectra, structural and lithium insertion properties." *RSC Advances*, 3 (2013), 19081-19096, DOI: 10.1039/c3ra41974f.

48. Lashua A., Smith T., Hu H., Wei L., Allis D.G., Sponsler M., and Hudson B. "Commensurate Urea Inclusion Crystals with the Guest (E,E)-1,4-Diiodo-1,3-Butadiene." *Crystal Growth & Design*, 13 (2013), 9, 3852-3855, DOI: 10.1021/cg400980b.

47. Bonnard G., Barrès A.-L., Mentré O., Allis D.G., Gatti C., Poizot P., and Frayret C. "The low-/room-temperature forms of the lithiated salt of 3,6-dihydroxy-2,5-dimethoxy-p-benzoquinone: a combined experimental and dispersion-corrected density functional study." *CrystEngComm*, 15 (2013), 15, 2809-2821, (cover image), DOI: 10.1039/C2CE26523K.

46. Hudson B.S. and Allis D.G. "Bond alternation in infinite periodic polyacetylene: Dynamical treatment of the anharmonic potential." *Journal of Molecular Structure*, 1032 (2013) 78-82, DOI:10.1016/j.molstruc.2012.07.051.

45. Hudson B.S. and Allis D.G. "The Structure of [18]-annulene: Computed Raman Spectra, Zero-Point Level and Proton NMR Chemical Shifts." *Journal of Molecular Structure - Jaan Laane Honour Issue*, 1023 (2012) 212-215, DOI:10.1016/j.molstruc.2012.05.016.

44. Clardy-James S., Allis D.G., Fairchild T.J., and Doyle R.P. "Examining the effects of vitamin B12 conjugation on the biological activity of insulin: A molecular dynamic and in vivo oral uptake investigation." *MedChemComm*, 3 (2012), 1054-1058, DOI:10.1039/C2MD20040F.

43. Clardy S., Allis D.G., Fairchild T.J., and Doyle R. "Vitamin B12 in Drug Delivery: Breaking Through the Barriers to a B12 Bioconjugate Pharmaceutical." *Expert Opinion on Drug Delivery*, 8, 1 (2011) 127-140, DOI:10.1517/17425247.2011.539200.

42. Allis D.G., Helfrich B., Freitas Jr., R. A., and Merkle R. C. "Analysis of Diamondoid Mechanosynthesis Tooltip Pathologies Generated via a Distributed Computing Approach." *Journal of Computational and Theoretical Nanoscience*, 8 (2011) 1139-1161, DOI:10.1166/jctn.2011.1792.

41. Allis D.G., Fairchild T.J., and Doyle R. "The Binding of Vitamin B12 to Transcobalamin(II); Structural Considerations for Bioconjugate Design – a Molecular Dynamics Study." *Molecular Biosystems*, 6 (2010) 1611-1618. DOI:10.1039/c003476b.

40. Buchanan W.D., Allis D.G., and Ruhlandt-Senge S. "Synthesis and Stabilization – Advances in Organoalkaline Earth Metal Chemistry." *Chemical Communications*, 46 (2010) 4449-4465. DOI:10.1039/C002600J.

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SUPPLEMENTAL INFORMATION

A more extensive CV and research description, including the ever-popular nanotechnology gallery, can be found at www.somewhereville.com.