

David Punihaole

Curriculum Vitae

✉ David.Punihaole@uvm.edu

Professional Appointments

- 2020 – present **Materials Science Program Faculty Member**–University of Vermont
2020 – present **Assistant Professor of Chemistry**–University of Vermont
2016 – 2020 **Postdoctoral Researcher**–University of Minnesota
Advisor: Renee R. Frontiera

Education

- 2009 – 2016 **Doctor of Philosophy**–Molecular Biophysics and Structural Biology
University of Pittsburgh
Advisor: Sanford A. Asher
2005 – 2009 **Bachelor of Science**–Molecular Biology (magna cum laude)
University of Pittsburgh
Advisor: M. Brian Traw

Honors and Awards

- 2018 – 2019 Ford Foundation Postdoctoral Fellowship
Only postdoctoral researcher selected by the National Academy of Sciences, Engineering, and Medicine to be awarded a fellowship in physics or chemistry
2009 Phi Beta Kappa

Publications

(*) represents (co-)corresponding author, (†) represents co-first authorship

15. Van Bruggen, C.†; **Punihaole D.**†; Keith, A.; Schmitz, A.J.; Tolar, J.; Frontiera, R.R.; Reineke, T.M. “Quinine Copolymer Reporters Promote Efficient Intracellular DNA Delivery and Illumination Protein-Induced Unpackaging Mechanism.” *Proceedings of the National Academy of Sciences*. **2020**: 117(52), 32919–32928.
14. Graefe, C.T.; **Punihaole, D.**; Lynch, M.J.; Silva, W.R.; Frontiera, R.R. “Stimulated Raman Imaging Below the Diffraction Limit with a MHz Laser.” *Journal of Raman Spectroscopy*. **2020**: 1–8.
13. Graefe, C.T.; **Punihaole, D.**; Harris, C.M.; Lynch, M.J.; Leighton, R.; Frontiera, R.R. “Far-Field Label-Free Super Resolution Microscopy.” *Analytical Chemistry*. **2019**: 91(14), 8723–8731.

12. **Punihaole, D.***; Workman, R.J; Upadhyay, S.; Van Bruggen, C.; Schmitz, A.J.; Reineke, T.M.; Frontiera, R.R.* “New Insights into Quinine-DNA Binding using Raman Spectroscopy and Molecular Dynamics Simulations.” *The Journal of Physical Chemistry B*. **2018** : 122(43), 9840–9851.
11. **Punihaole, D.†**; Jakubek, R.S.†; Workman, R.J; Asher, S.A. “Interaction Enthalpy of Side Chain and Backbone Amides in Polyglutamine Solution Monomers and Fibrils.” *The Journal of Physical Chemistry Letters*. **2018**: 9(8): 1944–1950.
10. **Punihaole, D.†**; Jakubek, R.S.†; Workman, R.J; Marbella, L.E.; Campbell, P.; Madura, J.D.; Asher, S.A. “Monomeric Polyglutamine Structures that Evolve into Fibrils.” *The Journal of Physical Chemistry B*. **2017**: 121(24): 5953–5967.
9. Sharma, B.; Cardinal, M.F.; Ross, M.B., Zrimsek, A.; Bykov, S.V.; **Punihaole, D.**; Asher, S.A.; Schatz, G.C.; Van Duynes, R.P. “Aluminum Film-Over-Nanosphere Substrates for Deep-UV Surface-Enhanced Resonance Raman Spectroscopy.” *Nano Letters*. **2016**: 16(12): 7968–7973.
8. Cai, Z.; Luck, L.A.; **Punihaole, D.**; Madura, J.D.; Asher, S.A. “Glucose Binding Protein Hydrogel Conformationally Induced Volume Phase Transition.” *Chemical Science*. **2016**: 7: 4557–4562.
7. **Punihaole, D.**; Workman, R.J.; Hong, Z.; Madura, J.D.; Asher, S.A. “Polyglutamine Fibrils: New Insights into Antiparallel β -sheet Conformational Preference and Side Chain Structure.” *The Journal of Physical Chemistry B*. **2016**: 120(12): 3012–3026.
6. **Punihaole, D.**; Hong, Z.; Jakubek, R.; Dahlburg, E.; Geib, S.; Asher, S.A. “Glutamine and Asparagine Side Chain Hyperconjugation-Induced Structurally Sensitive Vibrations.” *The Journal of Physical Chemistry B*. **2015**: 119(41): 13039–13051.
5. Cai, Z.; Kwak, D.H.; **Punihaole, D.**; Hong, Z.; Velankar, S.S.; Liu, X.; Asher, S.A. “A Photonic-Crystal Protein-Hydrogel Sensor for *Candida albicans*.” *Angewandte Chemie International Edition*. **2015**: 54(44): 13036–13040.
4. **Punihaole, D.**; Jakubek, R.S; Dahlburg, E.M.; Hong, Z.; Myshakina, N.S; Geib, S.; Asher, S.A. “UV Resonance Raman Investigation of the Aqueous Solvation Dependence of Primary Amide Vibrations.” *The Journal of Physical Chemistry B*. **2015**: 119(10): 3931–3939.
3. Cai, Z.; Zhang, J.T.; Xue, F.; Hong, Z.; **Punihaole, D.**; Asher, S.A. “2D Photonic Crystal Protein Hydrogel Coulometer for Sensing Serum Albumin Ligand Binding.” *Analytical Chemistry*. **2014**: 86: 4840–4847.
2. Xiong, K.; **Punihaole, D.**; Asher, S.A. “UV Resonance Raman Spectroscopy Monitors Polyglutamine Backbone and Side Chain Hydrogen Bonding and Fibrilization.” *Biochemistry*. **2012**: 51: 5822–5830.

1. Levine, A.B.; **Punihaole D.**; and Levine, T.B. "Characterization of the Role of Nitric Oxide and Its Clinical Applications." *Cardiology*. **2012**: 122: 55–68.

Conference Presentations and Seminars

Invited Talks

- 2021 SPIE Phontonics West, San Francisco, CA (upcoming)
- 2020 Clemson University, Clemson, SC
- 2019 University of Cincinnati, Cincinnati, OH
Baylor University, Waco, TX
University of Vermont, Burlington, VT
Wintergreen Physical Chemistry Conference, Wintergreen, VA
- 2018 5th Annual Molecular Biophysics Symposium, University of Pittsburgh
- 2017 SciX National Meeting, Reno, NV
- 2016 SciX National Meeting, Minneapolis, MN
Prof. Richard Van Duyne's Research Group, Northwestern University
Prof. Renee Frontiera's Research Group, University of Minnesota
3rd Annual Molecular Biophysics Symposium, University of Pittsburgh
- 2015 Biomedical Graduate Student Association Symposium, University of Pittsburgh
SciX National Meeting, Providence, RI

Contributed Talks

- 2018 American Chemical Society National Conference, Boston, MA
- 2017 Biophysics Seminar, University of Minnesota
- 2016 Pittcon, Atlanta, GA
- 2015 2nd Annual Molecular Biophysics and Structural Biology Symposium, University of Pittsburgh
- 2014 Pittcon, Chicago, IL
- 2012 Pittcon, Orlando, FL

Conference Posters

- 2019 Conference of Ford Fellows, San Juan, PR
- 2018 Conference of Ford Fellows, Newport, CA
- 2014 International Conference on Raman Spectroscopy XXIV, Jena, Germany
- 2012 1st Annual Molecular Biophysics Symposium, University of Pittsburgh

- International Conference on Raman Spectroscopy XXIII, Bangalore, India
2010 International Conference on Raman Spectroscopy XXII, Boston, MA

Teaching Experience

University of Vermont

Current Topics in Chemistry (CHEM 318)
Instrumental Analysis (CHEM 221)
Analytical Spectroscopy (CHEM 226)

University of Minnesota

Analytical Spectroscopy (CHEM 8152), regular Guest lecturer
General Chemistry (CHEM 1061), regular Guest lecturer
Mentorship Program for Aspiring Chemistry Teachers (MPACT)

University of Pittsburgh

Quantum Mechanics (CHEM 1410), Graduate Teaching Assistant
Analytical Chemistry (CHEM 0250), Guest Lecturer

Grant Support

- 2020 - 2021 UVM OVPR EXPRESS Grant Program (\$3,000)
PI: **David Punihale**
- 2020 - 2021 UVM Sustainability Research Capitalization Funding (\$13,000)
Changing the Paradigm of Optical Microscopy: Development of a Raman Chemical Imaging Platform for Sustainable Research
PI: **David Punihale**

Advising and Supervision

Doctoral Students

- 2020 – present Maddie Hatch (Chemistry)
2020 – present Rusul Mustafa (Chemistry)

Undergraduate Students

- 2020 – present Nicholas Perez (Chemistry)
2020 – present Jessica Caruso (Chemistry)

Professional Service and Outreach

Professional Service

Independent Reviewer for: *The Journal of Physical Chemistry*, *The Journal of Chemical Physics*, *Spectrochimica Acta*, *Light: Science & Applications*, and *ACS Nano*

Outreach

- 2019 – 2020 Hennepin County Juvenile Probation Mentors for Success Program
Minneapolis, MN
- 2016 – 2018 Energy and U Program Volunteer, University of Minnesota
Minneapolis, MN