

# 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  $\beta$ -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.

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## 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 Punahaole**

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 Punahaole**

## 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

### Intramural Service Activities

2021 – present Lead Member, Department of Chemistry, Anti-Racist Chemistry Curriculum Revision Effort

2021 – present Member, BIPOC, Community/Social-building Committee

2020 – 2021 Member, Department of Chemistry, Certificate in Chemical Analysis Curriculum Committee

#### 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

#### Reviewer Activities

- The Journal of Physical Chemistry
- The Journal of Chemical Physics
- Spectrochimica Acta
- Light: Science & Applications
- ACS Nano