

Trevor N. Purdy

PROFESSIONAL EXPERIENCE

Scientist II, Analytical

Genomatica, Inc.

La Jolla, CA

January 2023 – Present

- Self-taught operation of an Agilent RapidFire to quantify primary metabolites from in small scale fermentation cultures for high throughput screening – capable of screening >5,000 samples per day
- Implemented automated sample transfer and multi-step dilution protocols using an Tecan Freedom EVO and Agilent Bravo liquid handlers that reduced sample prep time >5x
- Developed and validated 5 QQQ-MS reverse phase and HILIC methods for absolute quantitation of fermentation metabolites using isotope labelled standards
- Authored 5 SOPs and coordinated with external commercial partners for method cross-validation procedures
- Developed a quantitative NMR method to measure formation of carbamate products in fermentation broth (quantitation by ¹H NMR and verification of carbamate signals by HMBC experiments in pH-adjusted samples) in less than 2 weeks
- Trained 2 Research Associates and 1 Scientist to support high throughput sample preparation and absolute quantitation methods

Scientist II

Creo Ingredients

La Jolla, CA

October 2021 – January 2023

- Developed chiral column HPLC-UV methods for separation, purification, and quantitation of enantiomeric cannabinoid products on milligram scales
- Elucidated the structure of novel cannabinoid analogs generated in vitro using ¹H and 2D NMR
- Spearheaded enzyme discovery campaign for berberine bridge enzymes (BBEs) with cannabinoid synthase-like activity using HTP screening techniques, leading to the discovery of 10 novel bacterial enzyme scaffolds
- Engineered BBEs for chemoselective production of primary plant cannabinoid metabolites in a prokaryotic host organism
- Presented results directly to company executives in monthly research update meetings

Research Associate, Drug Discovery

Sirenas Marine Discovery

La Jolla, CA

March 2014 – July 2015

- Fractionated marine sponge crude extracts using a SepBox 2D-2000 to screen for biological activity, and acquired LC-MS data on crude extract fractions using an Agilent Q-ToF
- Purified and dereplicated ADC payloads from crude extracts and measured payload to mAb linking efficiency by HPLC-UV

Quality Assurance Intern

Hilmar Cheese Company

Hilmar, CA

May 2012 – August 2012

- Collaborated with lab technicians to review experiment protocol and equipment

- Updated, reorganized, and consolidated Research and Development department SOPs
- Presented solutions to management to maintain accurate and organized SOPs

RESEARCH EXPERIENCE

PhD Student Researcher (*Moore Lab*)

La Jolla, CA

UC San Diego, Scripps Institution of Oceanography

August 2015 – September 2021

- Isolated and characterized natural products from terrestrial and marine actinomycetes on milligram scales
- Optimized multi-gram synthetic routes to halogenated marine natural products tetrachloropyrrole, pentachloropseudilin, and polyhalogenated analogs for medicinal chemistry applications
- Achieved a 18-step chemoenzymatic synthesis chlorizidine A with a longest linear route of 11 steps and synthesized a panel of halogenated derivatives for structure-activity relationship (SAR) studies
- Heterologously expressed and purified microbial FAD-dependent oxidoreductase enzymes by FPLC
- Developed GC-MS, LC-MS, NMR, and fluorescence-based assays to screen FAD-dependent oxidoreductases for biocatalytic applications
- Mentored 3 undergraduate students to independently set up gram-scale chemical reactions and purify synthetic intermediates using HPLC and flash chromatography

Undergraduate Research Associate (*Lipomi Lab*)

La Jolla, CA

UC San Diego, Dept. of Nanoengineering

January 2013 – December 2013

- Synthesized organic semiconducting polymers for photovoltaic cells by methods with minimal environmental impact
- Purified and characterized polymer intermediates using column chromatography and NMR spectroscopy

Undergraduate Research Associate (*Christensen Lab*)

Copenhagen, Denmark

University of Copenhagen, Dept. of Chemistry

August 2012 – December 2012

- Determined rates of reaction for olefin reduction with three generations of dendrimer-encapsulated nanoparticles
- Analyzed the reaction kinetics using GC-MS and NMR spectroscopy

EDUCATION

University of California, San Diego

La Jolla, CA

Scripps Institution of Oceanography

September 2021

PhD, Chemical Biology

Advisor: Bradley Moore

University of California, San Diego

La Jolla, CA

B.S., Molecular Synthesis

June 2015

PUBLICATIONS

1. Love, A.C.; **Purdy, T.N.**; Hubert, F.M.; Kirwan, E.J.; Holland, D.C.; Moore, B.S. Discovery of Latent Cannabichromene Cyclase Activity in Marine Bacterial Flavoenzymes. *ACS Synthetic Biology*, 13, 1343-1354 (2024)
2. Castro-Falcón, G.; Straetener, J.; Bornikoel, J.; Reimer, D.; **Purdy, T.N.**; Berscheid, A.; Schempp, F.M.; Liu, D.Y.; Lington, R.G.; Brötz-Oesterhelt, H.; Hughes, C.C. Antibacterial Marinopyrroles and Pseudilins Act as Protonophores. *ACS Chemical Biology*, 19, 743-752 (2024)
3. Alker, A.T.; Farrell, M.V.; Demko, A.M.; **Purdy, T.N.**; Adak, S.; Moore, B.S.; Sneed, J.M.; Paul, V.J.; Shikuma, N.J. Linking Bacterial Tetrabromopyrrole Biosynthesis to Coral Metamorphosis. *ISME Communications*, 3, 98-101 (2023)
4. Wilkinson, I.V.L.; Castro-Falcón, G.; Roda-Serrat, M.C.; **Purdy, T.N.**; Straetener, J.; Brauny, M.M.; Maier, L.; Brötz-Oesterhelt, H.; Christensen, L.P.; Sieber, S.A.; Hughes, C.C. The Cyanobacterial “Nutraceutical” Phycocyanobilin Inhibits Cysteine Protease Legumain. *ChemBioChem*, 24, 1-10 (2022)
5. **Purdy, T.N.**; Moore, B.S.; Lukowski, A.L. Harnessing ortho-Quinone Methides in Natural Product Biosynthesis and Biocatalysis. *Journal of Natural Products*, 85, 688–701 (2022)
6. Zheng, J.; Antrobus, S.; Feng, W.; **Purdy, T.N.**; Moore, B.S.; Pessah, I.N. Marine and Anthropogenic Bromopyrroles Alter Cellular Ca^{2+} Dynamics of Murine Cortical Neuronal Networks by Targeting the Ryanodine Receptor and Sarco/Endoplasmic Reticulum Ca^{2+} -ATPase. *Environmental Science & Technology*, 55, 16023–16033 (2021)
7. **Purdy, T. N.**; Kim, M. C.; Cullum R.; Fenical, W.; Moore, B. S. Discovery and Biosynthesis of Tetrachlorizine Reveals Enzymatic Benzylic Dehydrogenation via an *ortho*-Quinone Methide. *JACS*, 143, 3682-3686 (2021)
8. Alker, A. T.; Delherbe, N.; **Purdy, T. N.**; Moore, B. S.; Shikuma, N. J. Genetic Examination of the Marine Bacterium *Pseudoalteromonas Luteoviolacea* and Effects of its Metamorphosis-Inducing Factors. *Environmental Microbiology*, 22, 4689-4701 (2020)
9. Chekan, J. R.; Lee, G. Y.; Gamal, A. E.; **Purdy, T. N.**; Houk, K. N.; Moore, B. S. Bacterial Tetrabromopyrrole Debrominase Shares a Reductive Dehalogenation Strategy with Human Thyroid Deiodinase. *Biochemistry*, 58, 5329-5338 (2019)
10. Petras, Daniel, **et al.** Mass Spectrometry-Based Visualization of Molecules Associated with Human Habitats. *Analytical Chemistry*, 88, 10775-10784 (2016)
11. Ficker, M.; Petersen, J. F.; Gschneidtner, T.; **Purdy, T. N.**; Hansen, J. S.; Poulsen, K. M.; Olsson, E.; Christensen, J. B. Size vs Reactivity in Dendrimer Encapsulated Subnanoparticles – Copper- and Copper-Cobalt Catalyzed Reductions. *Chemical Communications*, 51, 9957-9960 (2015)
12. Printz, A. D.; Savagatrup, S.; Burke, D. J.; **Purdy, T. N.**; Lipomi, D. J. Increased Elasticity of a Low Bandgap Conjugated Polymer by Random Segmentation for Mechanically Robust Solar Cells. *RSC Advances*, 4, 13635–13643 (2014)

PATENTS

1. **Purdy, Trevor N.**, Moore, Bradley S. CANNABINOID PRODUCTION IN BACTERIA, United States, 20250027127 (accepted January 2025)
2. Huddleston J.H.; Schirmer A.; **Purdy, T.N.**; Griffin, B.M. *Method of Producing Cannabinoids*. WO2023168277A2 (filed March 2023)

3. Huddleston, J.H.; Schirmer, A.; **Purdy, T.N.** *Flavin-dependent Oxidases Having Cannabinoid Synthase Activity*. WO2023032862A1 (filed August 2021)

HONORS & AWARDS

- American Society of Pharmacognosy Student Research Award (2020)

GRANTS & FELLOWSHIPS

- NIH Marine Biotechnology & Biomedicine Training Grant (2020)
- Herman P. and Sophia Taubman Foundation Endowed Graduate Fellowship (2018)
- Lloyd Green Family Endowed Fellowship (2017)
- Donald C. and Elizabeth M. Dickinson Foundation Fellowship (2015)
- McCrink Family Graduate Fellowship for the Center for Marine Biotechnology and Biomedicine (2015)

CERTIFICATIONS

MicroMBA

UC San Diego, Rady School of Management

La Jolla, CA

September 2017 – December 2017

INSTRUMENTATION AND SOFTWARE SKILLS

Agilent RapidFire
Sciex QTrap 4500
Shimadzu Nexera X2 UHPLC
Agilent 1200 Series HPLC
Bruker, Varian, and JEOL NMR
Agilent Accurate-Mass Q-ToF
Thermo Fisher Q Exactive Orbitrap
Bruker AmaZon IonTrap
ThermoFisher GC-FID
Teledyne Isco Combiflash EZ Prep
GE ÄktaPurifier FPLC
Agilent Bravo Liquid Handler
Tecan Freedom EVO Liquid Handler

Sciex Analyst
Agilent MassHunter
ThermoFisher Chromeleon
ThermoFisher Xcalibur
MestraNova
ChemDraw
Cytoscape
BiG-SCAPE
PyMOL
Spotfire
Microsoft Office
Benchling (LIMS)