

GOV. MSG. NO. 815

Jon-Paul Bingham BSc., BSc. (Hons.), PhD.

Associate Professor

Curriculum vitae

Department of Molecular Biosciences and Bioengineering
College of Tropical Agriculture and Human Resources
University of Hawaii at Manoa
1955 East-West Rd.,
Honolulu, HI 96822

Webpage: <http://www.ctahr.hawaii.edu/mbbe/Bingham.html>

Education/Employment:

- ❖ **Associate Professor & Graduate Chair** – Dept. of Molecular Bioscience and Bioengineering, University of Hawaii, Honolulu, HI, 2014 - present
- ❖ **Assistant Professor** – Dept. of Molecular Bioscience and Bioengineering, University of Hawaii, Honolulu, HI, 2007-2014
- ❖ **Assist Research Professor** – Dept. of Biology, Clarkson University, Potsdam, NY 2003-2007
- ❖ **Post-doctoral position** – Dept. of Pharmacology, Yale School of Medicine, New Haven, CT 2000-2003
- ❖ **Post-doctoral position** – Mass Spectrometry Facility, Dept of Pharmaceutical Chemistry, University of California, San Francisco, CA, 1998-2000
- ❖ **PhD. in Biochemistry** – Center for Drug Design and Development, Dept of Biochemistry, University of Queensland, Brisbane, Australia, 1993 – 1998
Thesis Title: Novel Toxins From the Genus *Conus* – From Taxonomy to toxins
Research Area: Proteomics, drug discovery; solid phase peptide synthesis and biochemistry of peptide toxins
Supervisors: Drs. Paul Alewood and Ross Smith
- ❖ **B.Sc. (Hons.)** – School of Science, Griffith University, Brisbane, Australia,
- ❖ **B.Sc.** – School of Science, Griffith University, Brisbane, Australia,

Professional Membership:

- ❖ The American Peptide Society (2012– present)
- ❖ The American Chemical Society (2006 – present)
- ❖ Advancing Science, Serving Society (AAAS; 2004 – present)
- ❖ The International Society on Toxinology (2003 – present)
- ❖ The Malacological Society of Australasia (1992 – present)
- ❖ The Federation of Clinical Biochemists (1991– present)

Professional Awards/Recognition:

- ❖ Excellence in Instruction College Teaching Award, University of Hawaii, Manoa – 2011
- ❖ The Peter V. Garrod Distinguished Graduate Mentoring Award, University of Hawaii, Manoa – 2017

Scientific Advisor/Editor:

- ❖ Review Editorial Board of *Frontiers in Chemical Biology* (Frontiers) 2013 – present
- ❖ Member of the Editorial Board – *Journal of Toxins* (Hindawi Publishing Corp) 2012 – present
- ❖ Vice President of and Program coordinator to the Hawaiian Malacological Society – 2012 – present
- ❖ President of the Hawaiian Malacological Society – 2011 – 2012, 2014 – 2015, 2017 – 2018, Present
- ❖ Board Director and Scientific Advisor to the Hawaiian Malacological Society – 2009 – Present

Contributions to Science

1. Peptide toxins (conotoxins), their discovery, chemical synthesis, and bioengineering have been a pivotal part of my research career and long-term focus, in their development as novel probes for mammalian and insect / invertebrate ion channels. We possess one of the only bio-sustainable supplies of milked *Conus* venoms in the world, which has lead us to development *in-house* animal husbandry techniques to feed and care for these highly venomous marine snails. Other investigators have followed our milked venom strategies, but these efforts have been short term.
 - a) Bingham JP, Baker MR, Chun JB. (2012) *Analysis of a cone snail's killer cocktail - The milked venom of Conus geographus*. *Toxicon*. Nov;60(6):1166-70.
 - b) Chun JB, Baker MR, Kim D H, Leroy M, Toribo P, Bingham JP (2012) Cone snail milked venom dynamics – a quantitative study of *Conus purpurascens*. *Toxicon*. 60(1):83-94.
 - c) Bergeron Z.L, Chun J.B, Baker M.R, Sandall D.W, Peigneur S., Yu P.YC, Thapa P., Milisen J.W, Tytgat J., Livett B.G, Bingham J-P. (2013) Analysis of the milked venom from the mollusk-hunting cone shell *Conus textile* – *Peptides*, 49, 145–158.
 - d) Kaponon CA, Thapa P., Cabalteja CC, Guendisch D. Collier AC and Bingham J-P. (2013) Conopeptide truncation as a post-translational modification to increase the pharmacological diversity within the milked venom of *Conus magus* – *Toxicon* 70, 170–178.

2. In our endeavors to advance the understanding, use, and discovery of new peptide toxins (including conotoxins), we have employed both classical and proteomic biochemical techniques to provide information on their structural activity relationships, such as rapid disulfide bond analysis and post-translational modification identification, features that are highly abundant in conotoxins, and in other peptide toxins derived from scorpions and spiders. It is these features that often provide difficulties in *de-novo* characterization or later chemical synthesis, and can hinder the progressive development of peptide toxins as potential human pharmaceuticals. Some of our research efforts address these bottle-necks in a hope to ensure rapid through-put and future development of lead compounds.
 - a) Bingham J-P., Bian S., Tan Z.Y., Takacs Z., Moczydlowski E. (2006) Synthesis of a biotin derivative of iberitoxin: binding interactions with streptavidin and the BK Ca²⁺-activated K⁺ channel expressed in a human cell line. *Bioconjug Chem*;17(3):689-99.
 - b) Xiao Y., Bingham J-P., Zhu W., Moczydlowski E., Liang S., Cummins T.R. (2008) Tarantula huwentoxin-IV inhibits neuronal sodium channels by binding to receptor site 4 and trapping the domain ii voltage sensor in the closed configuration. *J Biol Chem*. 2008 Oct 3;283(40):27300-13.
 - c) Bingham J-P., Mitsunaga E., Bergeron Z.L. (2010) Drugs from Slugs – Past, Present and Future Perspectives of omega-Conotoxin Research. *Chemico-Biological Interactions* 183 pp. 1-18.
 - d) Bingham J-P., Andrews E.A., Kiyabu S.M., Cabaltega C.C. (2012) Drugs from Slugs, Part II – Conopeptide Bioengineering. *Chemico-Biological Interactions* 200:92–113.

3. Our continued efforts in peptide synthesis with toxins and their bioengineering, has led to the advancement of novel chemical strategies to enhance the production of difficult peptides via thiol ester ligation – our process using Trifluoromethanesulfonic acid (TFMSA) avoids the use of Hydrogen Fluoride (HF), a major hurdle for most small peptide research laboratories, together with peptide *N*- to *C*-terminal cyclization – we see this as an avenue to engineering ‘parent-template’ toxins that hold the capacity for chemical selective bioconjugation, via *click*-chemistry, to produce pharmacologically stable compounds that enhance both the targeting and labeling of selective ions channels.

It is these ion channel targets, specifically in mollusk and insects, that provide us the most interest for developing novel approaches in agricultural science, food security and crop protection, together potentially impacting human health by combating blood flukes, and mollusk-vector diseases such snail fever and bilharzia (*Schistosomiasis*) and rat-lung-worm (*Angiostrongylus cantonensis*). Such diseases are often labeled “neglected tropical diseases,” but play havoc in third-world and/or developing countries, as too in agricultural workers.

- a) Bingham J-P, Chun J.B., Ruzicka M.R., Li Q.X., Tan Z.Y., Kaulin Y.A., Englebretsen D.R., Moczydlowski E.G. (2009) Synthesis of an iberitoxin derivative by chemical ligation: a method for improved yields of cysteine-rich scorpion toxin peptides. *Peptides*. 30(6):1049-57.
 - b) Thapa P., Cabaltega C.C., Philips E.E. 3rd, Espiritu M.J., Peigneur S., Mille B.G., Tytgat J., Cummins T.R., Bingham J.P. (2016) t-Boc synthesis of huwentoxin-i through native chemical ligation incorporating a trifluoromethanesulfonic acid cleavage strategy. *Biopolymers*. 106(5):737-45.
 - c) Thapa P., Espiritu M.J., Cabaltega C.C., Bingham J-P. (2014) The Emergence of Cyclic Peptides: The Potential of Bioengineered Peptide Drugs. *International Journal of Peptide Research and Therapeutics*, 20 (4): 545-551.
 - d) Zhang R-Y., Thapa P., M.J. Espiritu M.J., Menon V., Bingham JP. (2017) From Nature to Creation: Going around in Circles, the Art of Peptide Cyclization. *Bioorganic & Medicinal Chemistry*, 26 (6): 1135-1150.
4. There are my many students (both graduate and undergraduate), the future researchers. I take great pride in their accomplishments, here and beyond, knowing with confidence that they have received solid training in biochemistry – specific peptide, mass spectrometric and chromatographic sciences, and that they have had the opportunity to explore and advance their own interests with guidance and support. That they take on the path to developing their own careers, in academia or industrial research, a unique perspective of what lessons nature can provide us, and the true insights to the strategic pharmacological developments that have underpinned evolution and diversification of the nervous system. Following are publications with Dr. Michael Espiritu, presented here as a small sample of the important research that my students have done and are doing.

- a) Espiritu M.J., Cabalteja C.C., Sugai C.K., Bingham J-P. (2014) Incorporation of post-translational modified amino acids as an approach to increase both chemical and biological diversity of conotoxins and conopeptides. *Amino Acids* 46 (1)125-151.
- b) Espiritu M.J., Collier A.C, Bingham J-P. (2014) A 21st Century Approach to Age Old Problems: the ascension of biologics over the small molecule therapeutics. *Drug Discovery Today* 19 (8), 1109–1113.

Provisional Patents (1):

- ❖ Bingham, J-P., Novel Toxins Derived from the milked and duct venoms from the genus *Conus*; PPN: PP2129

Selected peer-reviewed publications (last 9 years, H index 18).

1. Teng E.S., Bingham J-P., Amore T.D. (2019) Identification and Quantification of Anthocyanidins in Modern Poinsettia Cultivars Using High Performance Liquid Chromatography (HPLC). *HORTSCIENCE* 54 (9) S58-S59.
2. Toves P.J., Bingham J-P., Amore T.D. (2019) Identification of Anthocyanidins in Anthurium Hybrids By High-Performance Liquid Chromatography *HORTSCIENCE* 54 (9) S305-S306.
3. Anderson T.W., Kantar M. Radovich T.J.K., Bingham J-P. (2019) Assessing Commercial Cultivar Potential in Sweet Potato (U'ala) Derived from Hawaiian Germplasm Using Phenotypic Data *HORTSCIENCE* 54 (9) S318-S319.
4. Tavares K.L.T., Radovich T.J.K., Bingham J-P., Calpito J., Amjad A., Kirk E., Teves G., Motomura S., Silva J., Uyeda J. Sugano J., Nakamura-Tengan L., (2019) Yield and Quality of Turmeric and Related Germplasm on Maui *HORTSCIENCE* 54 (9) S319-S320 .
5. Laczko R, Chang A, Watanabe L, Petelo M, Kahaleua K, Bingham JP, Csiszar K. (2019) Anti-inflammatory activities of *Waltheria indica* extracts by modulating expression of IL-1B, TNF-alpha, TNFR2 and NF-kappa B in human macrophages. *Inflammopharmacology*. 2019 Nov 4. doi: 10.1007/s10787-019-00658-6
6. Oeser SG., Bingham J-P., Collier AC. (2018) Regulation of Hepatic UGT2B15 by Methylation in Adults of Asian Descent. *Pharmaceutics*, 10 (1) 6 ; doi: 10.3390/pharmaceutics10010006
7. Mau A, Bingham JP, Soller F, Jha R (2018) Maturation, spawning, and larval development in captive yellowfoot limpets (*Cellana sandwicensis*). *Invertebrate Reproduction and Development*, 62, 239-247.
8. Mau A, Fox K, Bingham JP (2017) The Reported Occurrence of Hermaphroditism in the Yellowfoot Limpet (*Cellana sandwicensis* Pease, 1981). *Annals of Aquaculture Research*, 4, 1045.
9. Zhang R-Y., Thapa P., M.J. Espiritu M.J., Menon V., Bingham JP. (2017) From Nature to Creation: Going around in Circles, the Art of Peptide Cyclization. *Bioorganic & Medicinal Chemistry*, 26 (6): 1135-1150.
10. Thapa P., Cabalteja C.C., Philips E.E. 3rd, Espiritu M.J., Peigneur S., Mille B.G., Tytgat J., Cummins T.R., Bingham J.P. (2016) t-boc synthesis of huwentoxin-i through native chemical ligation incorporating a trifluoromethanesulfonic acid cleavage strategy. *Biopolymers*. 106(5):737-45
11. Maldonado A., Johnson A., Gochfeld D., Slattery M., Ostrander G.K., Bingham J.P., Schlenk D. (2016) Hard coral (*Porites lobata*) extracts and homarine on cytochrome P450 expression in Hawaiian butterflyfishes with different feeding strategies. *Comp Biochem Physiol C Toxicol Pharmacol.*, 179:57-63.
12. Carlos-Hilario L., Shimshock R., Ng C., Bingham J-P., David A. Christopher D.A. (2015) Screening *Carica papaya* native promoters driving stilbene synthase expression in *Arabidopsis thaliana* for resveratrol glucoside (piceid) synthesis. *Plant Biotechnology Reports* 9, (5) 307–317.
13. Griffis, J. L., Jr., McDonald, T. G., Manners, M. M., Bingham, J. P (2015) Some Effects of Refrigerated Storage on Postharvest Quality of Ripe Fruits of the Tropical, Purple-Fruited Pitanga (*Eugenia uniflora* L.) *ACTA HORTICULTURAE* 1088, 113-118.
14. Halford Z.A., Yu P.Y.C, Likeman R.K., Hawley-Molloy J.S, Thomas C. and Bingham J-P. (2015) Revised first aid and clinical interventions for cone snail envenomation. *The Journal of Diving and Hyperbaric Medicine*, 45(3):200-7.
15. Lina H-T., Jan P. Amendt J.P, LaRowe D.E., Bingham J-P., Cowena J.P (2015) Dissolved amino acids in oceanic basaltic basement fluids. *Geochimica et Cosmochimica Acta* Vol. 164 (Sept.);175–190
16. Bingham J-P., Likeman R.K, Hawley J.S., Yu P.Y.C., and Halford Z. A. (2014) Conotoxins. In: *Manual of Security Sensitive Microbes and Toxins*, Ed. D. Liu; CRC Press ISBN: 1466553960. p.467-484.

17. Espiritu M.J, Collier A.C, Bingham J-P. (2014) A 21st Century Approach to Age Old Problems: the ascension of biologics over the small molecule therapeutics. *Drug Discovery Today* 19 (8), 1109–1113.
18. Cleveland V., Bingham J-P., Kan E. (2014) Heterogeneous Fenton degradation of bisphenol A by carbon nanotube-supported Fe₃O₄. *Separation and Purification Technology* 133, 388–395.
19. Thapa P., Espiritu M.J., Cabaltea C.C., Bingham J-P. (2014) Conotoxins and their regulatory considerations. *Regulatory Toxicology and Pharmacology*, 70 (1) 197-202.
20. Negi V.S., Bingham J-P., Li Q.X., Borthakur D. (2014) A Carbon-Nitrogen Lyase from *Leucaena leucocephala* Catalyzes the First Step of Mimosine Degradation. *Plant Physiology*, 164 (2) 922-934.
21. Takacs Z., Imredy J.P., Bingham J-P., Zhorov B.S., Moczydlowski E.G. (2014) Interaction of the BKCa channel gating ring with dendrotoxins, *Channels*, 8 (5) 421-432.
22. Yafuso J.T, Negi V.S., Bingham J-P., Borthakur D. (2013) Characterization of O-acetylserine (thiol) lyase from *Leucaena leucocephala*. *The FASEB Journal*, 27:580.3
23. Yafuso J.T, Negi V.S., Bingham J-P., Borthakur D. (2014) An O-Acetylserine (thiol) Lyase from *Leucaena leucocephala* Is a Cysteine Synthase But Not a Mimosine Synthase. *Applied Biochemistry and Biotechnology* 173 (5) 1157-1168.
24. Espiritu M.J., Cabaltea C.C., Sugai C.K., Bingham J-P. (2014) Incorporation of post-translational modified amino acids as an approach to increase both chemical and biological diversity of conotoxins and conopeptides. *Amino Acids* 46 (1)125-151
25. Thapa P., Espiritu M.J., Cabaltea C.C., Bingham J-P. (2014) The Emergence of Cyclic Peptides: The Potential of Bioengineered Peptide Drugs. *International Journal of Peptide Research and Therapeutics*, 20 (4): 545-551.
26. Thapa P., Zhang R-Y., Menon V., Bingham J-P. (2014) Native Chemical Ligation: A Boon to Peptide Chemistry. *Molecules* 19(9):14461-83.
27. Bergeron Z.L, Chun J.B., Baker M.R, Sandall D.W, Peigneur S., Yu P.YC, Thapa P., Milisen J.W, Tytgat J., Livett B.G, Bingham J-P. (2013) Analysis of the milked venom from the mollusk-hunting cone shell *Conus textile* – Peptides, 49, 145–158.
28. Kapon CA, Thapa P., Cabaltea CC, Guendisch D. Collier AC and Bingham J-P. (2013) Conopeptide truncation as a post-translational modification to increase the pharmacological diversity within the milked venom of *Conus magus* – *Toxicon* 70, 170–178
29. Negi V.S., Bingham J-P., Li Q.X., Borthakur D. (2013) midD-encoded 'rhizomimosinase' from *Rhizobium* sp. strain TAL1145, catabolizes Lmimosine into 3-hydroxy-4-pyridone, *Amino Acids*. 2013 Jun;44(6):1537-47
30. Devappa R.K., Bingham J-P. and Khanal S.K. (2013) New and modified high performance liquid chromatography method for rapid quantification of phorbol esters in *Jatropha curcas* seed. *Industrial Crops and Products* 49:211-219
31. Bergeron ZL, Bingham JP (2012) Scorpion Toxins Specific for Potassium (K⁺) channels: A Historical Overview of Peptide Bioengineering. *Toxins* 4,1082-1119.
32. Bingham JP, Andrews EA, Kiyabu SM*, Cabaltea CC (2012) Drugs from Slugs, Part II – Conopeptide Bioengineering. *Chemico-Biological Interactions* 200 (2012) 92–113.
33. Bingham JP, Baker MR, Chun JB. (2012) *Analysis of a cone snail's killer cocktail - The milked venom of Conus geographus*. *Toxicon*. Nov;60(6):1166-70.
34. Chun JB, Baker MR, Kim D H, Leroy M, Toribo P, Bingham JP (2012) Cone snail milked venom dynamics – a quantitative study of *Conus purpurascens*. *Toxicon*. 60(1):83-94.
35. Bingham JP., Mitsunaga E., Bergeron Z.L. (2010) Drugs from Slugs – Past, Present and Future Perspectives of omega-Conotoxin Research. *Chemico-Biological Interactions* 183 pp. 1-18.

Current Papers In Reviewer or 2nd submission:

1. **Title:** How disulfide bonds “lie”- Disulfide induced topological isomerization within the novel c-Conotoxin PnID
Authors: Michael J. Espiritu, Christopher K. Sugai, Parashar Thapa, Walter P. Niemczura, Zenaida G. Baoanan, Michael H. Baumann, and Jon-Paul Bingham
Submitted Journal: ACS Chemical Biology

- Title:** The role of posttranslational modifications in forming globular and ribbon structures of a 4/6 a-conotoxin from the vermivorous *Conus virgo*
Authors: Chino C. Cabaltega, Parashar Thapa, Megan Chi, David W. Sandall, Joycelyn B. Chun, Margaret R. Baker Shaun Kiyabu, Ken Gayler, Bruce G. Livett, David Christopher and Jon-Paul Bingham
Submitted Journal: Toxicon

Current Papers In Preparation (corresponding author only):

- Title:** Understanding molluscan reproduction through endocrinological studies – a review of involved signaling pathways and their potential to propel aquaculture forward
Authors: Bridget E. Murphy, Angelica R. Valdez, Anthony Mau, Jon-Paul Bingham
Target Journal: General and Comparative Endocrinology // Invertebrate Reproduction and Development
- Title:** Signaling mechanisms involved in settlement and metamorphosis of marine molluscs in aquaculture: A Review
Authors: Angelica R. Valdez, Bridget E. Murphy, Anthony Mau, and Jon-Paul Bingham
Target Journal: Journal of Experimental Marine Biology and Ecology // Invertebrate Reproduction and Development // Frontiers in Marine Science
- Title:** Gonadotropin Releasing Hormone- like peptide is not an acute spawn-inducer for Prosobranch Limpets (*Cellana spp.*).
Authors: Mau A, Camson A, Bingham JP
Target Journal: General and Comparative Endocrinology.
- Title:** Near-daily reconstruction of tropical intertidal SST from limpet shells to infer their growth rates
Authors: Mau A, Franklin EC, Nagashima K, Huss GA, Valdez AR, Nicodemus PN, Bingham JP
Target Journal: Nature Ecology & Evolution.
- Title:** Structural properties of a novel bioactive Mini-M conotoxin: Discovery and characterization of conotoxin MIIB from *Conus magus*.
Authors: Zhang, R.-Y., Espiritu M. J., Loening N. M., Kapono C. A. & Bingham J.-P.
Target Journal: Journal of Biological Chemistry

Ongoing Research Support

Title: CSBR-Ownership Transfer: Curate, Preserve and Transfer Agriculturally and Environmentally Significant Microorganisms to a Laboratory Equipped for Preservation and Distribution

Objective: Culturing soil bacteria for preservation and distribution (select agents)

Role: Co-PI

Agency: NSF

Period: 2016-2020

Title: 'Opihi Aquaculture Year 5 & 6: Improving Hatchery Technology and Production

Objective: Aquaculture of opihi, the Hawaiian limpets (*Cellana spp*)

Role: PI

Agency: CTSA

Period: 2018-2020

Title: Investigation of peptide toxin cyclotides as a novel approach to insecticide development

Objective: Peptide toxin pesticide bioengineering and development

Role: PI

Agency: USDA

Period: 2015-2020

Completed Research Support

Title: Investigating the application of peptide pesticides: Diversifying Molluscicide targeting Capabilities and Enhancing Bio-delivery.

Objective: Peptide toxin pesticide bioengineering and development

Role: PI

Agency: USDA

Period: 2010-2012

Title: Post-harvest management of slugs and snails potentially carrying Rat Lungworm (*Angiostrongylus cantonensis*) on Hawaii's farms and gardens.

Objective: Peptide toxin pesticide discovery and development

Role: Co-PI

Agency: USDA-CDC

Period: 2011-2013

Title: Evaluating the Risk of Diphacinone Rodenticide Pellets to Hawaiian Trigger Fish

Objective: Toxicology of pesticides

Role: PI

Agency: US-FWS/HI DNLR

Period: 2011-2014

Title: From Chemistry to Consumption: Exploiting the unique chemical constituency of *Capsicum frutescens* to develop a novel Pacific Island crop.

Objective: Chemical analysis of chili peppers

Role: PI

Agency: DOA, HI

Period: 2013-2014

Synergistic Activities

(i) Graduate Chair of MBBE (2014 - Present): Overseeing one of the largest Graduate Programs in the UH system requires significant effort in student requirement and retention. The MBBE program produces 48% of all CTAHR's Ph.D. graduates, typically 3-5/semester. The MBBE Graduate program typically consist of 65-80 student, 45% MS and 55% PhD. The efforts of the Graduate Chair encompass many different tasks and coordination between various UH offices to ensure our students are advised correctly and progress through the degree at the minimal time. Student compliance, resolving student issues is a major part of the position. As we improve and advance the MBBE program, we have specific recognition from faculty, and UHM Graduate Division as being an innovator in graduate education and management.

Graduate Chair 2014-Present, implementation of new student tools:

- Student recruitment and orientation to the program; 1:1 interactions with each GR student
- New MBBE Student orientation seminar
- MBBE Academic Planner (MS and Ph.D)
- MBBE Student Handbook
- MBBE Student Guidebook
- MBBE Student Filling Handbook
- MBBE PhD. and MS – Proposal calculator
- MBBE PhD and MS Proposal Rubric and Student evaluation sheet
- MBBE PhD Flyer
- How Well do you know the rules that govern your graduate degree?
- MBBE Individual Professional Development Plan (IDP) – presently under development

This appointment has provided essential mentoring, managerial skills and networks to advance my own skills as an accomplished graduate mentor.

(ii) Director of the INBRE III PATHways Program (2017/ Year 5 INBRE III summer - present): INBRE (IDeA Networks of Biomedical Research Excellence) is a Hawaii statewide grant program involving most of our undergraduate-based institutions and nearly all of our UH community colleges. The core mission of INBRE is to get UG students involved in biomedical research right from the beginning of their college experience. INBRE also supports a cadre of young investigators (new tenure-track faculty) as sites for the INBRE intern experience. http://inbre.jabsom.hawaii.edu/?page_id=11.

INBRE IV represents UH's second largest single grant, equally \$19,010,077.00 (2018 – 2022).

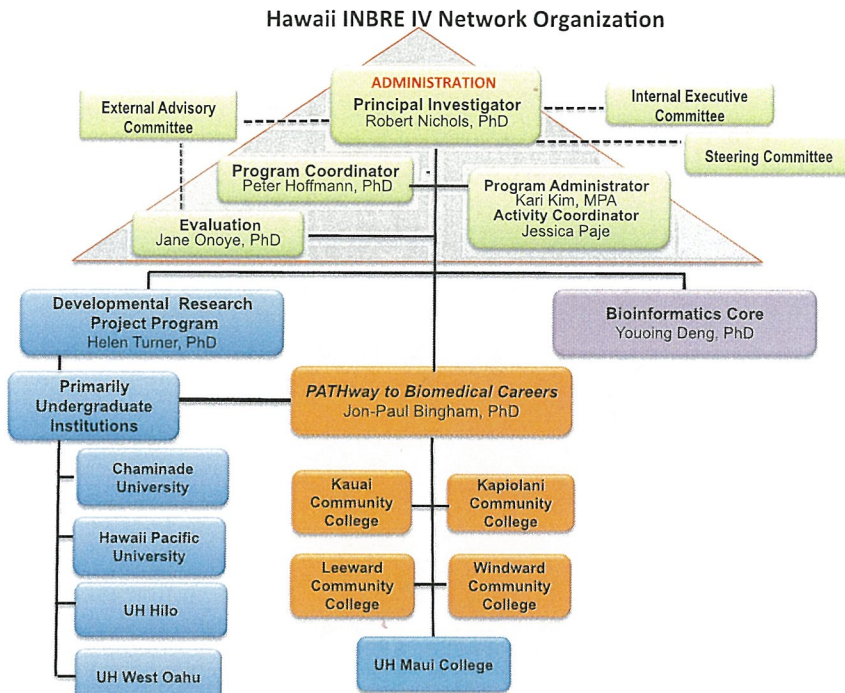


Figure 2. Organizational Chart

As INBRE PATHways Director I coordinate all UG research activities, and have implemented a number of new programs that have seen the increase in student participation and retention across the state.

INBRE IV Number of Students by Institution Type & Campus

Last update: 11/13/19

Status: (Multiple Items)

Count of Last Name, First Name Row Labels	Columns (= INBRE III)															= INBRE IV				Grand Total	
	= Year 1			= Year 2			= Year 3			= Year 4			= Year 5			= Year 1		= Year 2			
	2 - Fall	3 - Spring		1 - Summer	2 - Fall	3 - Spring	1 - Summer	2 - Fall	3 - Spring	1 - Summer	2 - Fall	3 - Spring	1 - Summer	2 - Fall	3 - Spring	1 - Summer	2 - Fall	3 - Spring	1 - Summer		2 - Fall
= UH	15	27		24	22	22	31	22	23	32	25	35	41	40	36	36	41	39	46	43	600
Hawaii Community College	2	2	3	2	3	3	2	3	1	2	3	5	1	1	1	1	1	1	1	1	24
Kapiolani Community College (KCC)	6	8		9	7	6	6	7	5	7	3	6	3	6	8	8	8	7	8	8	126
Kaula Community College	1	3		4	2	1	3	2	2	1	2	1	4	1	1						28
Leeward Community College (LCC)	1	3		6	1		9	1	4	10		2	10			13	6		17	5	88
University of Hawaii at Manoa (UHM)	3	2		1	1	1	4	3	6	8	10	11	16	25	21	13	20	22	20	22	209
University of Hawaii Maui College (UHMC)	1	5		5	5		4	4		6	6		3	5		4	3		4	2	53
Windward Community College (WCC)	3	4		4	4	6	7	2	1	4	1	4	7	5	1	2	9	1	1	6	72
= PU	10	11		7	13	14	15	13	13	13	14	16	12	19	30	27	34	39	21	29	350
Chaminade University (CUH)	2	2		1	4	3	2	3	2	2	3	2	5	4	3	3	4	1	1	2	48
Hawaii Pacific University (HPU)	3	4		2	4	5	9	4	3	6	6	7	5	10	13	10	10	18	11	11	141
University of Hawaii at Hilo (UHH)	5	5		4	5	6	4	6	8	5	5	7	2	4	12	13	16	16	5	11	139
University of Hawaii West Oahu (UHWO)													1	2		1	4	4	4	5	21
Grand Total	25	38		31	35	36	46	35	36	45	39	51	53	59	66	63	75	78	67	72	950

This appointment has allowed me the opportunity to build a strong collaborative network with faculty across 9 Hawaiian institutes, as too providing a strong foundational network with senior UH administration. It has also provided me the ability to promote the MBB (UG) and MBBE Graduate programs, and develop and novel pilot UG educational milestones to advance and prepare Hawaii's UGs for both the workforce and professional graduate education.

(iii) Implementation of Responsible Conduct of Research (RCR) training as a semester graduate program with in MBBE (MBBE 610 Seminar – When a PhD. is not enough), which is now being adapted as template to meet needs of the whole UHM system.

(iv) Sponsor/Mentoring of undergraduate interns via:

- (i) The Undergraduate Research Opportunities Program (UROP) (<http://manoa.hawaii.edu/undergrad/urop/>) (8 students)

- (ii) The Brazil Scientific Mobility (BSMP) Program is sponsored by CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) and CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico).
(<http://www.iie.org/Programs/Brazil-Scientific-Mobility#.WCj42oXyHAo>)
(4 students)

Other Activities:

- ❖ Chaired Recruitment Search committees
 1. MBBE Plant Biochemistry, Position # 82027 (2016)
 2. MBBE Biomolecular Interactions, Position # #84193 (2019)
- ❖ Faculty mentorship NIH CORBA (2019) – Dr. Arif Momonda
- ❖ Faculty Advisory Committee for REEU (2019) MM and Ngh
- ❖ Appointed member of the CTAHR Associate Dean of Students Advisory Council (2017-18)
- ❖ Advisory Committee Dr. Ingelia White – Agpharmtech Windward CC
- ❖ Govern Appointment member of the Hawaii State Oversight Committee for Medical marijuana (2016 - present)
- ❖ Govern Appointment member of the Hawaii State Pesticide Board (2016 - present)
- ❖ Judge for Science Fair at St. Andrews (2018)
- ❖ Co-organizer of the inaugural CTAHR 3MEP (2016)
- ❖ Co-organizer of the Office of Graduate Education Three Minute Thesis competition (2016, 2017, 2018)
- ❖ Vice-President of the CTAHR Faculty Senate, 2013 – 2014
- ❖ Member of the CTAHR Faculty Senate Executive, 2011– 2014, Instructional Review Committee
- ❖ Represented CTAHR at Rat Lung Worm Disease Scientific Workshop, Honolulu, Aug. 16-18 (2011)
- ❖ Represented MBBE in May Commencement Exercises, 2008, 2009, 2010, 2011, 2012, 2013, 2014 and 2015, 2018, 2019.
- ❖ Represented MBBE in December Commencement Exercises, 2011
- ❖ Participant in the UH-Manoa Strategic Planning Process Focus Group session (October 2010)
- ❖ Represented CTAHR at Teaching “SURVIVAL SKILLS” AND ETHICS 16th Annual Trainer-of-Trainers Conference Supported by NIH, June 21-26, 2010, Santa Fe, New Mexico
- ❖ Member of the CTAHR Faculty Senate, 2009 – 2010, Member of the Instructional Review Committee
- ❖ Represented CTAHR on Faculty Panel—Striking a Balance: Teaching, Research, Service-for the New Faculty Orientation (Jan. 2009)
- ❖ Member of MBBE Graduate Steering Committee (2009)
- ❖ Member of MBBE curricula committee (2009 - Present)
- ❖ Represented MBBE on Biology Steering Committee (2008-2009)
- ❖ MBBE representative/shop steward for the University of Hawaii’s Professional Assembly, 2007-2009, 2020
- ❖ Associate Dean of Students Advisory Counsel 2017
- ❖ Scientific Judging Annual CTAHR Student Research Symposium:
 - (a) 2013 – 2018 Head judge CTAHR for CTAHR and COE Research Symposium, University of Hawaii, Honolulu.
 - (b) 2012 – PhD. Posters; MS Orals, 24th CTAHR and COE Student Research Symposium.
 - (c) 2011 – MS orals (Chair); PhD. Posters (Chair), 23rd Annual CTAHR Student Research Symposium, April 8-9, Honolulu;
 - (d) 2010 – PhD orals (Chair); PhD. Posters (Chair);, 22nd Annual CTAHR Student Research Symposium, April 9-10, Honolulu;
 - (e) 2009 – PhD orals; PhD. Posters, 21st Annual CTAHR Student Research Symposium, April 3-5, Honolulu;
 - (f) 2008 – PhD orals; PhD. Posters, 20th Annual CTAHR Student Research Symposium, April 11-12, Honolulu;
 - (g) 2007 – PhD orals; PhD. Posters, 19th Annual CTAHR Student Research Symposium, March 9-10, Honolulu.
- ❖ UHM Three Minute Thesis Competition Head Judging coordinator (2016, 2017 and 2018) Office of Graduate Education
- ❖ UHM Three Minute Thesis organization committee 2018, 2019
- ❖ CTAHR Three Minute Elevator Pitch Inaugural Competition (2017, 2018)

Conference organization:

- ❖ Head judge CTAHR for 25th, 26th, 27th, 28th, 29th and 30th CTAHR and COE Research Symposium, University of Hawaii, Honolulu, 2013 – 2019
- ❖ Scientific Advisory Committee; 23rd American Peptide Society Symposium/6th International Peptides Symposium. Hilton Waikoloa Village Big Island, Hawaii, June 22-27, 2013.
- ❖ Judge for Poster competition: 23rd American Peptide Society Symposium/6th International Peptides Symposium. Hilton Waikoloa Village Big Island, Hawaii, June 22-27, 2013.

Graduate Student Mentorship - Bingham PI, University of Hawaii:

❖ PhD Level (6) - Bingham PI:

1. Zachary Bergeron, MBBE (2013), Title: Peptide Toxin Bioengineering Advancement of Fluorescent Probe Design for Targeting Human K⁺ Channels.
2. Parashara Thapa, MBBE (2016), Title: Bioengineering of conopeptides to study the pharmacokinetics and pharmacodynamics of peptide cyclization.
3. Michael Espiritu, MBBE (2017), Title: Exploring the Post Translational Modifications of *Conus* Peptides and their influence on isomer formation and biological activity.
4. Ray Zhang (2019) Title: The Expansion of Conotoxin Diversity: Characterization of Novel Conotoxin MIIIB From *Conus magus*
5. Anthony Mau (2019) Title: The Aquaculture and Biology of 'Opihi 'Alinalina (*Cellana Sandwicensis*)
6. Nicholas Sinclair – Title: TBA (topic Fermentation Biochemistry) , **Present Student**

❖ MSc Level – Plan A (22) - Bingham PI:

1. Sean Wiere (2019) MS Title: TBA (topic: a-conotoxins proteomics), **Present Student**
2. Angel Valdez (2019) MS Title: TBA, (topic: Opihi Aquaculture) **Present Student**
3. Bridget Murphy (2019) MS Title: TBA (topic: Opihi peptide hormones), **Present Student**
4. Justin Calpito (2018) MS Title: TBA, (topic: Turmeric) **Present Student**
5. Erick Delgado (2017) MS – Title: (topic: peptide bioengineering) TBA, **Present Student**
6. Megan Chi (2017) – Title: TBA, **resigned**
7. Mahrukh Khawaja - (2016) Title: Reconciling pH in Recirculating Aquaponic System Impacting Nitrification and Pepper Yield. **Past student.**
8. Angelique Showman (Co-Mentor) – (2016) Title: Chemical and Microbial Ecology of 'Awa, *Piper Methysticum* (*G. Forst*) **Past student.**
9. Vinay Menon - (2016) Title: Cyclization and Derivatization of the Potassium Channel Antagonist Tertiapin **Past student.**
10. Christopher Sugai (2015), Title: Characterization of Milked Venom from *Conus obscurus* in Search of Novel Bioactive Compounds. **Past student.**
11. Peter Yu, MBBE (2014); Title: Design and use of Fluorophore cyclotides. **Past student**

12. Zan Halford, MBBE (2014), Title: Peptide bioengineering of a kv1.3 channel probe: utilizing azide chemistry in fluorescent bioconjugation. **Past student.**
13. Liz Andrews, MBBE (2013) Title: Effects of Diet Manipulation on Conopeptide Profiles in Fish-Eating *Conus striatus*. **Past student.**
14. Chino Cabaltega, MBBE (2013), Title: The means and ends all to thiol chemistry - a peptide journey from disulfide bonds to thiol-ester ligation **Past student.**
15. Kristen Wheeler, MBBE (2013); Title: Quantitative Chemical Analysis of Flavonoids in Purple Fruited Selections of Pitanga (*Eugenia uniflora* L.). **Past student.**
16. Jeffery Milisen, MBBE – (2012); Title: Conopeptide Production through Biosustainable Snail Farming. **Past student**
17. Cliff Kapon, MBBE – (2012); Title: Characterization of Novel Conotoxins Derived from the Milked Venom of *Conus magus*. **Past student.**
18. Joycelyn Chun, MBBE – (2011); Title: Exploration of Novel Techniques and Approaches in the Study of Conopeptides. **Past student.**
19. Zeb Philips, MBBE – (2010); Title: Thiol-mediated Ligation and Characterization of Native and Mutant Huwentoxin-I Peptides on Voltage-gated Sodium Channels (Na_v). **Past student.**
20. Do Kim – terminated, 2011. **Past student.**
21. Zachary Bergeron (graduated 2007; Clarkson University – Biomolecular Science major); Title: The Molecular Engineering of Potassium Channel Probes: A Stepwise Approach to Cellular Imaging of BK and hERG Ion Channels. **Past student.**
22. Adam Labaff (graduated 2006; Clarkson University); Title: Structural Design and Synthesis of Novel Peptide Bioconjugates for Quantification and Visualization of the hERG Channel. **Past student.**

MSc Level – Plan B (University of Hawaii) (2):

1. Elizabeth Mahi, MBBE, graduated 2012; Report: Cultivation of planktotrophic *Conus striatus* larvae. **Past student.**
2. Marissa Lee, MBBE, graduated 2016; Report: Development and Optimization of Plant Production Capacity in a Controlled Environmental Agricultural Facility. **Past student.**

Honors (1): (Clarkson University):

1. Sarah Morris (graduated 2006; Clarkson University): Identification of a Peptide with Antimicrobial Activity in the Venom of *Conus* **Past student.**

Undergraduate student mentorship (University of Hawaii) (34)*:

1. Brooke Kawamura (2019) [Biology](#) – *Conus* Aquaculture **Current UG student**
2. Danissa Ma'ae (2019) [Biology](#) – *Opihi* Aquaculture **Current UR student**
3. Vincent (2019) – Peptide engineering (2018, 2019) **Current UG student**
4. Angel Valdez (2018, 2019) [Marine Biology](#) *Opihi* Aquaculture **Current GR student**
5. Amihan Camson (2018, 2019) [Chemistry](#) **Current GR student**
6. Jenny Nguyen [Biology](#) – *Conus* Aquaculture (2019) **Current UG student**
7. Chloe Delos Reyes, [Biology](#) (2017 – 2019) – Peptide toxin production **Past student**
8. Brett N. Cain (2018, 2019) [Chemistry](#) **Past student**
9. Shelby Robertson (2018) [Marine Biology](#) *Opihi* Aquaculture **Past student**
10. Philippe N. Nicodemus (2018) [Biology](#) - *Opihi* Aquaculture **Past student**

11. Brandon Day – Peptide engineering (2017, 2018) [Marine Biology](#) **Past student**
12. JP Arios (2017) ([Kinesiology/Biology](#)) – Peptide engineering (2018) **Past student**
13. Ted Fitch (2015, 2016) [Biology](#) **Past student**
14. Erick Delgado, [Chemistry](#) – Peptide engineering, **Current GR student**
15. Rebecca Church, [MBB](#) (2016, 2017)– Peptide toxin production **Past student**
16. Jon Tello, [MBB](#) (2015-2016) – Peptide toxin production **Past student**
17. Eric Collier, [Biology](#) (2015)– Peptide synthesis. **Past student**
18. Tiffany-Heather Ulep, [MBB](#) (2014, 2015) – *Conus* Venoms. **Past student**
19. Kristen Tovar, [Biology](#) (2014, 2015)– *Conus* Aquaculture. **Past student**
20. Collin Liang, [Biology](#) (2014) – Peptide synthesis. **Past student**
21. Harlacher, Jenna M., [Biology](#) (2013 Fall) Butterfly fish toxicity. **Past student.**
22. Peter Yu, [Biology](#) (2012) Peptide Synthesis and isolation. **Past student.**
23. David Slater, [Biology](#) (2011) Toxicology of Trigger fish. **Past student.**
24. Shaun Kiyabu, [Biology](#) (2011) Peptide oxidation and folding. **Past student.**
25. William Pryor, [Biology](#) (BYU) (2010) (presently Medicine at Medical University of South Carolina) Isolation of a peptide from *Conus lividus*. **Past student.**
26. Leilani Manglicmot, [Biology](#) (2010) Rapid bench top estimation of thiol oxidation. **Past student.**
27. Nicholas Fujii, [Biology](#) (2009) (Dentistry at University of Missouri, Kansas City) Milked venom of *Conus obscurus*. **Past student.**
28. Steven Gonslaves, [Biology](#) (2009) (graduate Doctor of Medicine, UH JABSOM) Milked venom of *Conus geographus*. **Past student.**
29. Jessica Leong, [Biology](#) (2009) (practicing pharmacist) Milked venom of *Conus striatus*. **Past student.**
30. Jeff Milisen, [Biology](#) (2009) (graduated MSc. from Bingham Laboratory) *Conus* aquaculture. **Past student.**
31. Parashara Thapa, PEB (2009) Chemical Synthesis of α -conotoxin M1280. **Past student.**
32. Zan Halford, [Biology](#) (2009) Azide chemical linkers. **Past student.**
33. Jaclyn Hara, [Biology](#) (2008) (practicing pharmacist) *Conus* aquaculture. **Past student.**
34. Jacob Ishibashi, Dept. of Chem. (Boston College)(2008) – PhD. Fullerton CA.) Chemical synthesis of a novel peptide linker. **Past student.**

High School science projects at the University of Hawaii (2)*:

1. Kristen Morrison (2008) Darien High School, Connecticut – summer internship. **Past student.**
2. Kristel Rodillas and Tyler Kriedler (2011) - Advanced Placement Biology class at Waipahu High School (Hawaiian Malacological Society award at the State Science Fair). **Past students.**

Senior Thesis (7) (Clarkson University):

1. Aaron Tandy (**graduated 2007**; Clarkson University – Chemistry major): Synthesis of novel non-native Fmoc amino acids used for peptide bioconjugation. **Past student.**
2. Scott Belina (**graduated 2007**; Clarkson University – Biomolecular Science major): Synthesis and purification of a novel class of α -conotoxins **Past student.**
3. Terrance Richards (**graduated 2008**; Clarkson University – Biology major): Synthesis of two highly selective μ -conotoxins for fluorophore bioconjugation **Past student.**
4. James V. Coleman II (**graduated 2007**; Clarkson University – Biomolecular Science major): Novel Methods for the Elongation and Derivatization of Amine Containing Side Chains in Solid Phase Peptide Synthesis **Past student.**
5. Edwin E. Phillips III (**graduated 2006**; Clarkson University – Biomolecular Science major): Synthesis, Oxidation and Pharmacology of Huwentoxin-I **Past student**
6. K'Drea Fox (**graduated 2005**; Clarkson University – Biology major): Analysis of *Conus pennaceus* through Taxonomical and Structural Techniques

7. Tung Luong (**graduated 2005**; Clarkson University – Biology major): Proteomic and Genomic Approaches in the Identification of Conoprotein Found in *Conus catus*. **Past student**

Undergraduate Student Awards (12) - University of Hawaii:

2015

Theodore Fitch - 27th CTAHR and COE Research Symposium MBBE Best Undergraduate Oral Presentation; **Role: PI**

2013

Peter Yu – MBBE Best Undergraduate Poster Presentation - 25th CTAHR and COE Research Symposium. **Project:** Cone Snails, Cyclized Peptides, and Fluorophores – A Gateway to Traceable Peptides. **Role: PI.**

2012

Peter Yu – Gamma Sigma Delta Award of Merit (2nd place overall) at the 24th CTAHR and COE Student Research Symposium. **Project:** Using an Optimized Methodology of TFMSA Cleavage in Peptide Synthesis Bioengineering. **Role: PI.**

2011

Elizabeth Mahi – Student Research Award; Graduate Professional Access (GPA) Program. **Project:** Cultivation of planktotrophic *Conus textile* larvae. **Role: PI.**

Alec Nordschow – Best Research Presentation Poster Category Award. 28th Marine Option Program Student (MOPS) Symposium, University of Hawaii Hilo campus. **Project:** Developmental Analysis through Protein Quantification of *Conus striatus* Veliger. **Role: PI.**

Kenny Masuda – Research Award, University of Hawaii, Manoa, Undergraduate Research Opportunities Council. **Project:** Molecular finger-printing of *Conus pennaceus* from the Hawaiians Islands **Role: PI.**

Nolan Spann – MBBE Best Undergraduate Poster Presentation 23rd CTAHR Student Research Symposium. **Project:** Non-Translationally Modified Toxins as Molluscicides **Role: PI.**

Shaun Kiyabu – INBRE Summer Undergraduate Research Internship program. **Project:** Selective Disulfide Bond Formation in α -conotoxins **Role: PI.**

2010

Alec Nordschow – Best Research Project Category Award (oral). 27th Annual Marine Option Program Student (MOPS) Symposium, University of Hawaii Hilo campus. **Project:** Developmental Analysis Through Protein Quantification of *Conus striatus* eggs. **Role: PI.**

2009

Parashar Thapa – Gamma Sigma Delta, Award of Merit, awarded in the category of Undergraduate Student Poster Presentation. 21st CTAHR Student Research Symposium, University of Hawaii Manoa campus. **Project:** Alpha conotoxin peptide truncation – a potential novel means of post-translational modification for phyla and pharmacological specificity. **Role: PI.**

2008

Jacob Ishibashi – PRIDE Summer Undergraduate Research Internship program. **Project:** Peptide probes: Addressing Problems in design and synthesis. **Role: PI.**

Graduate Student Awards (35 awards):

2017

Anthony Mau - Best Graduate Poster Award for the 42nd Albert L. Testers Memorial Symposium.

Rui-Yang Zhang - 29th CTAHR Student Research Symposium Gamma Sigma Delta PhD Student Poster Presentation

Anthony Mau - 29th CTAHR Student Research Symposium, CTAHR MS Student Oral Presentation Award of Merit

2016

Michael Espiritu - 28th CTAHR and COE Research Symposium, CTHAR Best PhD Student Oral Presentation **Role: PI**

2015

Parashar Thapa - 27th CTAHR and COE Research Symposium, MBBE Best PhD Student Oral Presentation **Role: PI**

2014

Chino Cabalteja – (a) University Medal for Masters Level Research; University of Hawaii System. **Role: PI**
(b) - 26th CTAHR and COE Research Symposium MBBE Best MS Student Oral Presentation, **Role: PI**

Christopher Sugai – MERCK Scholarship, 8 month internship with MERCK Germany, **Role: PI**

Nicholas Sinclair - 26th CTAHR and COE Research Symposium MBBE Best MS Student Poster Presentation, **Role: PI**

2013

Zachary Bergeron – (a) Student Travel Fellowship for 23rd American Peptide Society Symposium/6th International Peptides Symposium. Hilton Waikoloa Village Big Island, Hawaii, June 22-27; (b) Achievement Rewards for College Scientists (ARCS) Foundation: Scholar of the Year (joint); (c) Achievement Rewards for College Scientists (ARCS) Foundation: Helen Jones Farrar award in Tropical Agriculture Research; (d) 25th CTAHR and COE Student Research Symposium – CTAHR Best PhD. Student Oral Presentation, **Project:** Validation of a Novel, Direct Conjugate Scorpion Toxin-Fluorophore for the Investigation of the Large Conductance Ca²⁺-activated Potassium Channel, BK. **Role: PI.**

Parashar Thapa – (a) Student Travel Fellowship for 23rd American Peptide Society Symposium/6th International Peptides Symposium. Hilton Waikoloa Village Big Island, Hawaii, June 22-27, 2013; (b) 25th CTAHR and COE Student Research Symposium – Gamma Sigma Delta PhD Student Poster Presentation, **Project:** Optimization of novel Thiol-Ester ligation technique for expanding the potential of Native Chemical Ligation, **Role: PI.**

Vincent Cleveland - 25th CTAHR and COE Student Research Symposium – CTAHR Best MS Student Oral Presentation, **Project:** Adsorption and Heterogeneous Oxidation of Endocrine Disrupting Compounds in Wastewater Using Nano Metal Catalyst-Deposited Carbon Nanotubes, **Role: Co-PI.**

2012

Chino Cabalteja – 24th CTAHR and COE Student Research Symposium. CTAHR Best MS Student Poster Presentation, **Project:** Challenging the Dogma that Bioactive α -Conotoxins are Globular, **Role: PI.**

Elizabeth Mahi – 24th CTAHR and COE Student Research Symposium. MBBE Best MS Student Oral Presentation, **Project:** Cultivation of Planktonic *Conus striatus* Larvae. **Role: PI.**

Zachary Bergeron – 24th CTAHR and COE Student Research Symposium. CTAHR PhD Student Oral Presentation Award of Merit, **Project:** Peptide Toxin Bioengineering - Advancement of Fluorescent Probe Design for Targeting Human K⁺ Channels, **Role: PI.**

Elizabeth Andrews – Representative for the American Society of Biochemistry and Molecular Biosciences Hill Day, Washington DC, Sept. 10-12, **Role: PI.**

2011

Cliff Kapon – (a) CTAHR Departmental Merit Scholarship Fall 2010; (b) Manoa Opportunity Grant Fall 2010/Spring 2011; (c) UHM second Century Scholarship Fall 2010/Spring 2011; (d) Kahuewai Ola Native Hawaiian Scholarship Fall 2010/Spring 2011; (e) Imi Na'auao Post Secondary Scholarship Fall 2010/Spring 2011; (f) Native Hawaiian Science and Engineering Mentorship program Malolo Award Fall 2010; (g) Kahuewai Ola Native Hawaiian Scholarship Fall 2011; (h) Tuition Imi Naauao scholarship 2011; (i) NSEMP scholarship 2011. **Role: PI.**

Erin Yafuso – The Board of Directors of the Pacific Orchid Society Award. 23rd Annual CTAHR Student Research Symposium. **Project:** Functional characterization of a *Dendrobium* F5'3'H gene in the Petunia model system. **Role:** Co-PI.

Zachary Bergeron – Gamma Sigma Delta, Award of Merit, awarded in the category of MBBE Best PhD. Student Oral Presentation 23rd Annual CTAHR Student Research Symposium. **Project:** Venom From A Far; How a Cone Shell Will Travel. **Role:** PI.

Kristen Wheeler – Student travel grant from the American Society for Horticulture Science. Sept. 25-28th Waikola, HI. **Project:** Flavonol and Anthocyanin Analyses of Purple-fruited Selections of *Eugenia uniflora* L. (Pitanga) by High Performance Liquid Chromatography. **Role:** PI.

Chino Cabalteja – McNair Summer Research Internship program. **Project:** Challenging the Dogma that Bioactive α -Conotoxins are Globular **Role:** PI.

2010

Do Kim – (2010) Gamma Sigma Delta, Award of Merit, awarded in the category of MBBE Best MS Student Oral Presentation. 22nd Annual CTAHR Student Research Symposium. **Project:** Bioengineering of ω -conotoxin GVIA: Probes for the N-type neuronal Ca^{2+} channel. **Role:** PI.

Zachary Bergeron – (2010) Federation of American Societies for Experimental Biology, Graduate Student Travel Scholarship; in Anaheim, CA, April 24-28. **Project:** Design development and application of a fluorescent probe to study changes in hERG channel density and trafficking; a mechanistic basis for cardiac arrhythmia. **Role:** PI.

Graduate Student Dissertation / Thesis Committees, University of Hawaii:

❖ Dissertation Committee PhD Level (Total 26; 5 current):

1. Devin Takara MBBE (PI Dr. Khanal) – **graduated, 2013**; Title: Green Processing of a Tropical Grass for Biofuel and Biobased Products.
2. Vishal Negi, MBBE (PI Dr. D. Borthakur) – **graduated 2012**; Title: Biochemistry of mimosine catabolism by enzymes from *Rhizobium* sp. TAL1145 and *Leucaena leucocephala*.
3. Alejandro Preciado, Dept. of Chem. (PI Dr. P. Williams) – **graduated, 2012**; Title: Stereochemistry of γ -Amino- β -Hydroxy Acids of Natural and Synthetic Origins.
4. Maribel Zaporteza, MBBE (PI Dr. W. Su) – **graduated, 2011**; Title: Transgenic expression and characterization of secretory Antimicrobial peptides in yeast and plant cell cultures.
5. Eun Ju Cho, MBBE (PI Dr. D. Christopher) – **graduated, 2011**; Title: Identification, Characterization, and sub-cellular localization of Protein Disulfide Isomerase (PDI) in *Arabidopsis thaliana*.
6. Sreeramula Kalluri, Dept. of Chem. (PI Dr. J. Garret); Title: Biosynthesis of Thuricin CD – terminated, 2013
7. Norman Wang, MBBE (PI Dr. G. Presting) – terminated, 2012
8. Zachary Bergeron, MBBE (JPB Chair/PI); Title: Peptide Toxin Bioengineering Advancement of Fluorescent Probe Design for Targeting Human K^+ Channels.
9. Archanal Pal, MBBE (PI Dr. D. Borthakur); Functional Characterization of Chloroplastic and Cytoplasmic β -Carbonic Anhydrase Isoforms from *Leucaena leucocephala*.

10. Steffen Oeser MBBE (PI Dr. A. Collier) – **graduated, 2015**; Title: The effects of obesity on UDP-glucuronosyl transferase enzymes expression and activity.
11. Parashara Thapa, MBBE (JPB Chair/PI) – **graduated, 2015**; Title: Bioengineering of conopeptides to study the pharmacokinetics and pharmacodynamics of peptide cyclization.
12. Nhan Hua, MBBE (PI Dr. H. Ako) – **graduated, 2015**; Title: Development of Aquaculture Technology for the Hawaiian Opihi *Cellana* spp.
13. Margaret Baker, MBBE (PI Dr. X. Li) – **graduated, 2015**; Title: Structure characterization of windmill palm peroxidase in relation to roles of glycosylation on stability and catalysis.
14. Kazue Ishihara, MBBE (PI Dr. D. Borthukar) – **graduated, 2016** Title: Mechanical stress induces resistance against Wilt Disease caused by *Fusarium Oxysporum* in *Acacia Koa*.
15. Michael Espiritu, MBBE (JPB Chair/PI) – **graduated, 2016** Title: Exploring the Post Translational Modifications of *Conus* Peptides and their influence on isomer formation and biological activity.
16. Zhibin Liang MBBE (PI Dr. Q. Li) – **graduated, 2018**; Title: C-GLYCOSYLFLAVONES AGAINST ALZHEIMER'S DISEASE: FROM DISCOVERY TO MECHANISM OF ACTION
17. Camila Ortega MBBE (PI Dr. Q. Li) – **graduated, 2018**; Title: THE ROLE OF GLYCEROL IN THE DEGRADATION OF DIBENZOTHIOPHENE BY BURKHOLDERIA SP. C3
18. Samson Souza Chem (PI Dr. Ng) – student/faculty re-located
19. James Murphy MBBE (PI Dr. R. Richmond) – **graduated, 2019**; Title: INVESTIGATION OF ANTIOXIDANT DEFENSE PROFILES AND STRESS RESPONSE IN POCILLOPORA DAMICORNIS
20. Ray Zhang MBBE (JPB Chair/PI) – **graduated, 2019**; Title: The Expansion of Conotoxin Diversity: Characterization of Novel Conotoxin MIIIB From *Conus magus*
21. Anthony Mau MBBE (JPB Chair/PI) – **graduated, 2019**; Title: The Aquaculture and Biology of 'Opihi 'Alinalina (*Cellana Sandwicensis*)
22. Michael Honda MBBE (PI Dr. D. Borthukar) – title: TBA; **Present Student**
23. Peter Toves TPSS (PI Dr. T. Amore) – title: TBA; **Present Student**
24. Emily Teng TPSS (PI Dr. T. Amore) – title: TBA; **Present Student**
25. Abdulla Ali, Sr PEPS (PI Dr. M. Wright) – title: TBA; **Present Student**
26. Nichahals Sinclair MBBE (JPB Chair/PI) – title: TBA; **Present Student**

❖ **Thesis Committee MSc Level (Total 28; 6 current):**

Plan A (University of Hawaii):

1. Todd (M. Kantar PI) TPSS– current student; **Title: TBA, Present Student**
2. Sean Wiere (JPB Chair/PI) Title: TBA (topic: a-conotoxins proteomics), **Present Student**
3. Angel Valdez (JPB Chair/PI) Title: TBA, (topic: Opihi Aquaculture) **Present Student**

4. Bridget Murphy (JPB Chair/PI) Title: TBA (topic: Opihi peptide hormones), **Present Student**
5. Justin Calpito (JPB Chair/PI) Title: TBA, (topic: Turmeric) **Present Student**
6. Erick Delgado (JPB Chair/PI) – current student; **Title: TBA Present Student**
7. Angelique Showman (Co-Mentor) (JPB Chair/PI) **graduated 2017; Title:**
8. Maia Corpuz (PI Dr. D. Borthukar) **graduated 2017**
9. Vinay Menon (JPB Chair/PI) **graduated 2016; Title:**
10. Richard Shimshock (PI Dr. D. Christopher) **graduated 2016**
11. Mahrukh Khawaja (JPB Chair/PI) **graduated 2016; Title:**
12. Sofia Roman (PI Dr. Q. Li) **graduated 2016**
13. Zan Halford, MBBE (JPB Chair/PI) – **graduated 2015**; Title: Peptide bioengineering of a kv1.3 channel probe: utilizing azide chemistry in fluorescent bioconjugation.
14. Christopher Sugai, MBBE (JPB Chair/PI) – **graduated 2015**; Title: Characterization of Milked Venom from *Conus obscurus* in Search of Novel Bioactive Compounds.
15. Chino Cabalteja, MBBE (JPB Chair/PI) – **graduated 2014**; Title: The means and ends all to thiol chemistry - a peptide journey from disulfide bonds to thiol-ester ligation
16. Peter Yu, MBBE (JPB Chair/PI) – **graduated 2014**; Title: Design and use of Fluorophore cyclotides.
17. Liz Andrews, MBBE (JPB Chair/PI) – **graduated 2014**; Title: Effects of Diet Manipulation on Conopeptide Profiles in Fish-Eating *Conus striatus*.
18. Shaun Kiyabu. (JPB Chair/PI): Title: *In-vitro* folding of conotoxins - resigned
19. Simon Che MBBE (PI Dr. A. Collier); Title: Post-Translational Protein Glycosylation as a Mechanism for Neonatal Maturation of UDP-Glucuronosyl Transferase Enzymes. - resigned
20. Kristen Wheeler, MBBE (JPB Chair/PI) – **graduated 2013**; Title: Quantitative Chemical Analysis of Flavonoids in Purple Fruited Selections of Pitanga (*Eugenia uniflora L.*).
21. Jeffery Milisen, MBBE (JPB Chair/PI) – **graduated 2012**; Title: Conopeptide Production through Biosustainable Snail Farming.
22. Cliff Kapon, MBBE (JPB Chair/PI) – **graduated 2012**; Title: Characterization of Novel Conotoxins Derived from the Milked Venom of *Conus magus*.
23. Majdouline LeRoy, MBBE (PI Dr. S. Khanal) – **graduated 2012**; Title: Ultrastructural Changes Associated with Different Pretreatments on Napier Grass.
24. Isabel Rushanaedy, MBBE (PI Dr. D. Borthakur) – **graduated 2012**; Title: Chitinase as Molecular Bioindicator of Resistance to *Fusarium oxysporum* in *Acacia koa*.
25. Joycelyn Chun, MBBE (JPB Chair/PI) – **graduated 2011**; Title: Exploration of Novel Techniques and Approaches in the Study of Conopeptides.

26. Zeb Philips, MBBE (JPB Chair/PI) – **graduated 2010**; Title: Thiol-mediated Ligation and Characterization of Native and Mutant Huwentoxin-I Peptides on Voltage-gated Sodium Channels (Na_v).
27. Do Kim MBBE (JPB Chair/PI) – terminated, 2011.
28. Jannai Yafuso, MBBE (PI Dr. D. Borthakur); Title: Isolation and characterization of O-acetylserine(thiol) lyase from *Leucaena leucocephala*.

Honors (2):

Past (University of Hawaii and Clarkson University):

1. Jennifer Ishimoto, MBBE (PI Dr. Q. Li), **graduated 2011**; Title: Degradation of pyrene by *Mycobacterium* species: single versus consortia.
2. Sarah Morris (JPB Chair/PI; **graduated 2006**; Clarkson University): Identification of a Peptide with Antimicrobial Activity in the Venom of *Conus*.

Education outcomes – Research Students from the Bingham Laboratory 2007 - Present (University of Hawaii ONLY).

Student		
Anthony Mau (PhD.)	Kualoa Ranch, HI	Workforce
Vinay Menon (MSc.)	Prude University	PhD.
Parahar Thapa (PhD.)	UC Davis, CA	Post-Doct
Michael Espiritu (PhD.)	Oregon State, Pharmacy School	Tenture Track Assistant Prof.
Zachary Bergeron (PhD.)	Norwich Chemicals, NY	Work force
Kristen Wheeler (MSc.)	'Iolani School, HI	High School Teacher Science
Jeffery Milisen (MSc.)	Kona Blue Aquaculture, HI	Work force
Cliff Kaponu (MSc.)	University of California, San Diego CA	Continuing Education – PhD.
Elizabeth Mahi (MSc.)	Dept. of Education, HI	Middle School Teacher
Joycelyn Chung (MSc.)	Western University OR	Continuing Education – P.A.
Zeb Philips (MSc.)	St. John Fisher Pharmacy School, NY	Pharm.D.
Nicholas Fujii[#]	Dental School (University of Missouri, Kansas City)	D.D.
Steven Gonslaves[#]	JABSOM, HI	M.D.
Jessica Leong[#]	Pharmacy School (University of the Pacific, CA)	Pharm.D.
Parashara Thapa	PhD. – Bingham Laboratory	Continuing Education
Zan Halford	MSc. – Bingham Laboratory	Health care work force
Peter Yu	MSc. – Bingham Laboratory	Lecturer - Thailand
William Pryor^{1#}	University of South Carolina, SC	M.D.
Jaclyn Hara[#]	Pharmacy School	Continuing Education – Pharm.D.
Erin Mitsunaga	MSc. – Stanford University	Continuing Education – MSc.
Kristen Morrison²	BSc. – Brown University, RI	Undergraduate
Jacob Ishibashi^{3#}	PhD. – Boston College, MA	Continuing Education – PhD.
Leilani Manglicmot[#]	Johns Hopkins School of Medicine, MD	Continuing Education – MSc.

#Undergraduate research student; ¹Semester Student from BYU²; Summer Intern High School Student from Danbury CT; ³Summer Intern Undergraduate Student via the NSF PRIDE Program.