JOHN (CHUNG-HAN) CHU, PH.D.

No.1, Section 4, Roosevelt Road
Department of Chemistry, Room A521
National Taiwan University
Taipei City 10617, Taiwan

(OFFICE) +886 2 3366.8654
(LAB) +886 2 3366.8653
(FAX) +886 2 3366.8671

www.bioactivemolecules.org
johnchu@ntu.edu.tw
john-chu-5bb30231 (LinkedIn)
@ahemolysin (Twitter)

As the chemical language of nature; the study of natural products shall help us better understand how living organisms communicate with each other and interact with their environment. My research group takes unconventional approaches towards natural product discovery and the study of their chemical and biosynthesis.

Positions

2019.08- Assistant Professor, National Taiwan University (Taipei, Taiwan)

Education

2010 Ph.D., Chemistry; The Scripps Research Institute
2004 B.S., Chemistry; National Taiwan University

Research Experience

2014-2019 **The Rockefeller University** | Postdoctoral Associate | Professor Sean F. Brady
Natural Product Discovery & Metagenomics
Developed a culture-independent approach (Syn-BNP) for the discovery of bioactive small molecules. Syn-BNP couples bioinformatics and chemical synthesis to convert the biosynthetic instructions encoded in natural product gene clusters into molecular structures.

2011-2014 **Yale University** | Dreyfus Foundation Postdoctoral Fellow | Professor Alanna Schepartz
Foldamer Design
Designed, synthesized, and characterized β-peptide bundles that self-assemble for carbohydrate recognition

2005-2010 **The Scripps Research Institute** | Ph.D. Student | Professor M. Reza Ghadiri
Next Generation Sequencing
Established the physical and chemical requisites of single-molecule nanopore DNA sequencing

2003-2004 **National Taiwan University** | Undergraduate Research Assistant | Professor Tien-Yau Luh
Organic Synthesis
Optimized a unique one-pot reaction for the synthesis of poly-substituted furans

2002-2003 **Academia Sinica** | Undergraduate Research Assistant | Professor Andrew H.J. Wang
Structural Biology
Characterized the structure and function mucrocetin, a snake venom protein from Taiwan habu

Honors & Awards

2019 國立台灣大學 化學系 新進教師傑出研究獎助金
2018 Rockefeller University Postdoctoral Association Career Development Award
2013 Yale University Postdoctoral Scholar Travel Fund
2011 Camille & Henry Dreyfus Environmental Chemistry Postdoctoral Fellowship
2004 Dr. An-Tai Chen Distinguished Research Scholarship (陳安泰醫師研究獎學金)

Teaching

Advanced Chemical Biology I (高等化學生物學) (Graduate Level)
Recent Literature in Chemical Research (書報討論)
Biochemistry (生物化學)
Bioorganic Chemistry (生物有機化學)
Natural Product Chemistry (天然物化學)

Invited Talks

2021.04 國立陽明交通大學 生物科技學系 (新竹)
Department of Bioscience and Technology, National Yang Ming Chiao Tung University (Hsinchu, Taiwan)

2021.03 國立台灣大學 生命科學系 (台北)
Department of Life Sciences, National Taiwan University (Taipei, Taiwan)

2020.09 台灣藥物化學研討會 (苗栗)
Pharmaceutical Society of Taiwan Annual Meeting (Miaoli, Taiwan)

2020.03 淡江大學 化學系 (新北)
Department of Chemistry, Tamkang University (New Taipei City, Taiwan)

2019.12 國立清華大學 化學系 (新竹)
Department of Chemistry, National Tsing Hua University (Hsinchu, Taiwan)

2019.12 中國化學年會 暨 亞洲化學大會 (台北)
Chinese Chemical Society and Asian Chemical Congress Joint Meeting (Taipei, Taiwan)

2019.11 中央研究院 生物化學研究所 (台北)
Institute of Biological Chemistry, Academia Sinica (Taipei, Taiwan)

2018.03 New Antibacterial Discovery & Development, Gordon Research Conference (Ventura, Calif., USA)

Funding

2020.01 - 2022.07 Bioinformatics guided design of combinatorial nonribosomal peptide libraries for the discovery of new antibiotics
Ministry of Science and Technology (中華民國科技部) 109-2113-M-002-005-MY3

2021.01 - 2023.12 A discovery platform for overlooked bioactive natural products
NTU Office of Research and Development (台大研究發展處) 109-B-CD-5203-25314)

2021.08 - 2024.07 Biosynthetic, mechanistic, and structural mimetic studies of MccJ25 using a combination of chemical approaches
Ministry of Science and Technology (中華民國科技部) 110-2113-M-002-022)

Publications (*§ denotes equal contribution, *denotes corresponding author*)

14. Wu, C.-H.; ***Chu, J**. Total synthesis and biological evaluation of pagoamide A. *Front. Chem.* **2021**, 9:741290 (doi: 10.3389/fchem.2021.741290).

13. Chung, H-H; Kao, C-Y; Wang, A T-S; **Chu, J;** Pei, J; Hsu, C-C. Reaction tracking and high-throughput screening of active compounds in combinatorial chemistry by tandem mass spectrometry molecular networking. *Anal. Chem.* **2021**, *93*, 2456-2463 (doi: 10.1021/acs.analchem.0c04481).

12. **Chu, J**; Koirala, B; Forelli, N; Vila-Farres, X; Ternei, MA; Ali, T; Colosimo, DA; Brady, SF. Synthetic-bioinformatic natural product antibiotics with diverse modes of action. *J. Am. Chem. Soc.* **2020**, *142*, 14158-14168 (doi: 10.1021/jacs.0c04376).

11. **Chu, J**; Vila-Farres, X; Brady, SF. Bioactive synthetic-bioinformatic natural product cyclic peptides inspired by nonribosomal peptide synthetase gene clusters from the human microbiome. *J. Am. Chem. Soc.* **2019**, *141*, 15737-15741 (doi: 10.1021/jacs.9b07317).

10. §Vila-Farres, X; **§Chu, J**; Ternei, MA; Lemetre, C; Park, S; Perlin, DS; Brady, SF. An optimized synthetic-bioinformatic natural product antibiotic sterilizes multidrug-resistant *Acinetobacter baumannii*-infected wounds. *mSphere* **2018**, *3*, e00528-17 (doi: 10.1128/mSphere.00528-17).

9. **§Chu, J**; §Vila-Farres, X; Inoyama, D; Gallardo-Macias, R; Jaskowski, M; Satish, S; Freudlich, JS; Brady, SF. Human microbiome inspired antibiotics with improved β-lactam synergy against MDR *Staphylococcus aureus*. *ACS Infect. Dis.* **2018**, *4*, 33-38 (doi: 10.1021/acsinfecdis.7b00056).
    - Featured as the Cover Story for the Human Microbiome Special Issue (January 2018) of *ACS Infectious Diseases*.
    - Reported by *Microbiome Digest*.

8. Cohen, LJ; Esterhazy, D; Kim, SH; Lemetre, C; Aguilar, RR; Gordon, EA; Pickard, AJ; Cross, JR; Emiliano, AB; Han, SM; **Chu, J**; Vila-Farres, X; Kaplitt, J; Rogoz, A; Calle, P; Hunter, C; Bitok, JK; Brady, SF. Commensal bacteria make GPCR ligands that mimic human signaling molecules. *Nature* **2017**, *549*, 48-53 (doi: 10.1038/nature23874).
   • Reported by *Technology Networks*, *The Medical News*, *Phys.Org*, etc.

7. [§]Vila-Farres, X; **[§]Chu, J**; Inoyama, D; Ternei, MA; Lemetre, C; Cohen, LJ; Cho, W; Reddy, BVB; Zebroski, HA; Freudlich, JS; Perlin, DS; Brady, SF. Antimicrobials inspired by nonribosomal peptide synthetase gene clusters. *J. Am. Chem. Soc.* **2017**, *139*, 1404-1407 (doi: 10.1021/jacs.6b11861).
   • Reported by *Nature Reviews Chemistry* (**2017**, *1*, 22) and Faculty 1000 Prime

6. **[§]Chu, J**; [§]Vila-Farres, X; Inoyama, D; Ternei, MA; Cohen, LJ; Gordon, EA; Reddy, BVB; Charlop-Powers, Z; Zebroski, HA; Gallardo-Macias, R; Jaskowski, M; Satish, S; Park S; Perlin, DS; Freudlich, JS; Brady, SF. Discovery of MRSA active antibiotics using primary sequence from the human microbiome. *Nat. Chem. Biol.* **2016**, *12*, 1004-1006 (doi: 10.1038/nchembio.2207).
   • Reported by *Science Daily*, *SciNews*, *Nature World News*, and *Ars Technica* and highlighted by Faculty 1000 Prime.

5. Cohen, LJ; Kang, HS, **Chu, J**; Huang, YH; Gordon, EA; Reddy, BV; Ternei, MA; Craig, JW; Brady, SF. Functional metagenomic discovery of bacterial effectors in the human microbiome and isolation of commendamide, a GPCR G2A/132. *Proc. Natl. Acad. Sci.* **2015**, *112*, E48245 (doi: 10.1073/pnas.1508737112).
   • Highlighted by Faculty 1000 Prime

4. Melicher, MS; **Chu, J**; Walker, AS; Miller, SJ; Baxter, RHG; Schepartz, A. A β-boronopeptide bundle of known structure for differential polyol recognition. *Org. Lett.* **2013**, *15*, 5048-5051 (doi: 10.1021/ol402381n).

3. **Chu, J**; González-López, M; Cockroft, SL; Amorin, M; Ghadiri, MR. Real-time monitoring of DNA polymerase function and stepwise single-nucleotide DNA strand translocation through a protein nanopore. *Angew. Chem. Int. Ed.* **2010**, *49*, 10106-10106 (doi: 10.1002/anie.201005460).
   • Reported by *RSC Chemistry World* (November 2010) and *Nano Today* (**2011**, *6*, 531).

2. Cockroft, SL; **Chu, J**; Amorin, M; Ghadiri, MR. A single-molecule nanopore device detects DNA polymerase activity with single-nucleotide resolution. *J. Am. Chem. Soc.* **2008**, *130*, 818-820 (doi: 10.1021/ja077082c).
   • Reported by *Nat. Nanotech.* (**2008**, *3*, 126), and *ACS Chem. Biol.* (**2008**, *3*, 92).

1. Huang, KF; Ko, TP; Hung, CC; **Chu, J**; Wang, AHJ; Chiou, SH. Crystal structure of a platelet-agglutinating factor isolated from the venom of Taiwan habu (*Trimeresurus mucrosquamatus*). *Biochem. J.* **2004**, *378*, 399-407 (doi: 10.1042/bj20031507).