

Cholpisit (Ice) Kiattisewee

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Synthetic Biologist: Genetic devices development towards organism retooling [LinkedIn](#)

Education

University of Washington Doctor of Philosophy , Molecular Engineering and Sciences (Data Science Option) GPA: 3.79/4.00 Distinguished Dissertation Award	Seattle, WA, USA 2018 – 2023
Mahidol University Master of Science , Chemistry (International Program) GPA: 4.00/4.00 Dean's List and Thesis Award	Bangkok, Thailand 2016 – 2017
Bachelor of Science , Distinction Program in Chemistry GPA: 3.89/4.00 First Class Honors	2012 – 2016

Research/Work Experience

- 2023 – Present *Postdoctoral Scholar* and
2018 – 2023 *Ph.D. Student* at Center for Synthetic Biology, Institute of Molecular Engineering and Sciences, University of Washington, WA, USA
(Advisors: Jesse Zalatan: Dept. of Chemistry and James Carothers: Dept. of Chemical Engineering) collaborating with interdisciplinary team at UW and national laboratories (PNNL, LBNL, and ORNL)
- Bacterial CRISPR transcriptional modulations tool development
 - Metabolic Engineering for carbon-conservation in multiple bacteria (e.g. *Pseudomonas putida*, *Bacillus subtilis*, *Acinetobacter baylyi*, etc.)
 - Model-driven DBTL cycle acceleration by tunable CRISPR programs
 - Genome-wide investigation of gene regulatory circuits with CRISPRa/i
- 2017 – 2018 *Research Assistant* at School of Biomolecular Science and Engineering, Vidhyasirimethi Institute of Technology (VISTEC), Thailand
(Advisor: Pimchai Chaiyen)
- Metabolic pathway engineering in *E. coli* for biofuel synthesis
 - New chemistry of Carboxylic Acid Reductase (CAR) enzyme
- 2016 – 2017 *Master Student* at Department of Chemistry, Faculty of Science, Mahidol University, Thailand
(Advisor: Torsak Luanphaisarnnont and Co-advisor: Chutima Jiarpinitnun)
- Kinetic investigation of conjugate addition reactions into allenic esters
 - Antibacterial activity tests of allenic esters against *Staphylococcus aureus*

Publications (ORCID: 0000-0002-6351-7352)

1. Alba Burbano, D. ⁺; Kiattisewee, C ⁺; Karanjia, A. V.; Cardiff, R. A. L.; Faulkner, I. D.; Sugianto, W.; Carothers, J. M.* **CRISPR Tools for Engineering Prokaryotic Systems: Recent Advances and New Applications.** *Annu. Rev. Chem. Biomol. Eng. Vol. 15.* In press.
2. Wongsatit, T. ⁺; Srimora, T. ⁺; Kiattisewee, C. ^{*}; Uttamapinant, C*. [Enzymes, auxiliaries and cells for the recycling and upcycling of polyethylene terephthalate \(PET\).](#) *Curr. Opin. Syst. Biol. Special issue in Synthetic Biology.* In press.

3. Alba Burbano, D. ⁺; Cardiff, R. ⁺; Tickman, B. I.; Kiattisewee, C.; Maranas, C.; Zalatan, J. G.*; Carothers, J. M.* [Engineering of prokaryotic activatable promoters enables multi-input processing CRISPRa/i circuitry](#). *PNAS* **2023**, *120* (30), 2220358120.
4. Sugianto, W.; Altin-Yavuzarslan, G.; Tickman, B. I.; Kiattisewee, C.; Yuan, S.-F.; Brooks, S. M.; Wong, J.; Alper, A. S.; Nelson, A.; Carothers, J. M.* [Gene expression dynamics in input-responsive engineered living materials programmed for bioproduction](#). *Materials Today Bio* **2023**, 100677.
5. Kiattisewee, C.⁺; Karanjia, A. V. ⁺; Legut, M.; Daniloski, Z.; Koplik, S.; Nelson, J.; Kleinstiver, B. P.; Sanjana, N. E.; Carothers, J. M.*; Zalatan, J. G.* [Expanding the scope of bacterial CRISPR activation with PAM-flexible dCas9 variants](#). *ACS Synth. Biol.* **2022**, *11*, 4103-4112.
6. Tickman, B. I.⁺; Alba Burbano, D.⁺; Chavali, V. P.; Kiattisewee, C.; Fontana, J.; Khakimzhan, A.; Noireaux, V.; Zalatan, J. G.*; Carothers, J. M.* [Multi-Layer CRISPRa/i Circuits for Dynamic Genetic Programs in Cell-Free and Bacterial Systems](#). *Cell Systems*. **2021**, *13*, 1-15.
7. Kiattisewee, C.; Dong, C.; Fontana, J.; Sugianto, W.; Peralta-Yahya, P.; Carothers, J. M.*; Zalatan, J. G.* [Portable bacterial CRISPR transcriptional activation enables metabolic engineering in *Pseudomonas putida*](#). *Metab. Eng.* **2021**, *66*, 283-295.
8. Pongpamorn, P.⁺; Kiattisewee, C.⁺; Kittipanukul, N.⁺; Jaroensuk, J.; Trisivirat, D.; Maenpuen, S.; Chaiyen, P.* [Carboxylic Acid Reductase Can Catalyze Ester Synthesis in Aqueous Environments](#). *Angew. Chem. Int. Ed.* **2021**, *60*, 5749.
9. Fontana, J.⁺; Dong, C.⁺; Kiattisewee, C.; Chavali, V. P.; Tickman, B. I., Carothers, J. M.*; Zalatan, J. G.* [Effective CRISPRa-mediated control of gene expression in bacteria must overcome strict target site requirements](#). *Nat. Commun.* **2020**, *11*, 1618.
10. Jaroensuk, J.⁺; Intasian, P.⁺; Kiattisewee, C.; Munkajohnpon, P.; Chunthaboon, P.; Buttranon, S.; Trisivirat, D.; Wongnate, T.; Maenpuen, S.; Tinikul, R.; Chaiyen, P.* [Addition of formate dehydrogenase increases the production of renewable alkane from an engineered metabolic pathway](#). *J. Biol. Chem.* **2019**, *294*, 11536.
11. Chuaboon, L.; Wongnate T.; Punthong, P.; Kiattisewee, C.; Lawan, N.; Hsu, C.-Y.; Lin, C.-H.; Bornscheuer, U.; Chaiyen, P.* [One-Pot Bioconversion of L-Arabinose to L-Ribulose in an Enzymatic Cascade](#). *Angew. Chem. Int. Ed.* **2019**, *131*, 2450.
12. Kiattisewee, C.; Kaidad, A.; Jiarpinittun, C.; Luanphaisarnnont, T.* [Kinetic studies of conjugate addition of amines to allenic and acrylic esters and their correlation with antibacterial activities against *Staphylococcus aureus*](#). *Monatsch. Chem.* **2018**, *149*, 1059.
13. Powers, I. G.; Kiattisewee, C.; Mullane, K. C.; Schelter, E. J.; Uyeda, C.* [A 1,2-Addition Pathway for C\(sp²\)-H Activation at a Dinickel Imide](#). *Chem. Eur. J.* **2017**, *23*, 7694.

Manuscripts under Revision and in Preparation

1. Fontana, J.⁺; Sparkman-Yager, D.⁺; Faulkner, I. D. ⁺; Cardiff, R.; Kiattisewee, C.; Walls, A.; Primo, T. G.; Kinnunen, P. C.; Garcia Martin, H.; Zalatan, J. G.*; Carothers, J. M.* **Guide RNA structure design enables combinatorial CRISPRa programs for biosynthetic profiling.** *Under revision at Nat Commun. Preprint available on bioRxiv. DOI: <https://doi.org/10.1101/2023.11.17.567465>*
2. Kiattisewee, C.⁺; Karanjia, A. V. ⁺; Cardiff, R. ⁺; Alvi, S. S.; Carothers, J. M.*; Zalatan, J. G.* **Design rules for bacterial CRISPRa enables synergistic gene activation.** *Manuscript in preparation. An abstract of this work presented at ASBMB annual meeting 2023 is available in a special issue of J. Biol. Chem.*
3. Kiattisewee, C.⁺; Faulkner, I. D.⁺; Scott, A. V.; Shin, J.; Radivojevic, T.; Karanjia, A. V.; Zucker, J.; Munoz, N.; Sauro, H.; Garcia Martin, H.; Beliaev, A.; Zalatan, J. G.*; Carothers, J. M.* **Bioproduction of Aromatic Amines Enabled By Stress-Resistant Bacteria.** *Manuscript in preparation. An abstract of this work presented at AIChE Annual Meeting 2022 is available [online](#).*

Selected Patent(s)

U.S. Patent Application No. 18/306960. Filed: April 24, 2023. Based on Provisional Patent Application No. 63/335,143 Filed: April 26, 2022. GENETIC MANIPULATION METHOD IN BACTERIA. Inventors: Cholpisit KIATTISEWEE, James M. CAROTHERS, Jesse ZALATAN, Ian D. FAULKNER, Jason FONTANA, Chen DONG

PCT-WO2019209187 A1: “A luciferase reporter system and an assay for gene expression profiling using the same” April 25th, 2018. Inventors: Pimchai CHAIYEN, Juthamas JAROENSUK, Cholpisit KIATTISEWEE, Jittima PHONBUPPHA, Thanyaporn WONGNATE, Ruchanok TINIKUL, Nattanon AKERATCHATAPAN

Selected Conferences (Oral Presentations)

1. Kiattisewee, C.⁺; Faulkner, I. D.⁺; Scott, V. A.; Radivojevic, T.; Shin, J.; Karanjia, A. V.; Zucker, J.; Munoz, N.; Sauro, H. M.; Martín, H. G.; Beliaev, A.; Zalatan, J. G.; Carothers, J. M. **Model-driven DBTL cycles acceleration with broad-host-range bacterial CRISPRa/i circuits.** *Synthetic Biology Young Speaker Series (SynBYSS) 2023*, [July 27th 2023](#). Selected Young Speaker
2. Kiattisewee, C.⁺; Faulkner, I. D.⁺; Zalatan, J. G.; Carothers, J. M. **Leveraging Aromatic Amines Bioproduction in Stress-resistant *Pseudomonas putida* with CRISPRa/i Gene Regulatory Tools.** *The 45th Symposium on Biomaterials, Fuels and Chemicals 2023*. Oral Presentation
3. Kiattisewee, C.⁺; Karanjia, A. V.⁺; Cardiff, R.⁺; Alvi, S. S.; Zalatan, J. G.; Carothers, J. M. **Design rules for multiple bacterial CRISPRa systems enable synergistic gene activation.** *ASBMB Annual Meeting 2023*. Oral Presentation
4. Kiattisewee, C.⁺; Faulkner, I. D.⁺; Scott, V. A.; Radivojevic, T.; Shin, J.; Karanjia, A. V.; Zucker, J.; Munoz, N.; Sauro, H. M.; Martín, H. G.; Beliaev, A.; Zalatan, J. G.; Carothers, J. M. **Model-driven DBTL cycles acceleration with broad-host-range bacterial CRISPRa/i circuits.** *Volcano Conferences 2023*. Oral Presentation
5. Kiattisewee, C.⁺; Faulkner, I. D.⁺; Zalatan, J. G.; Carothers, J. M. **Bioproduction of Aromatic Amines Enabled By Stress-Resistant Bacteria.** *AIChE Annual Meeting 2022*. Oral Presentation
6. Kiattisewee, C. **Bacterial CRISPR tools for metabolic engineering applications.** *VISTEC-Manchester Mini-Symposium: Synthetic Biology and Biocatalysis 2022, Thailand*. Invited Speaker
7. Kiattisewee, C.; Dong, C.; Fontana, J.; Sugianto, W.; Karanjia, A.; Peralta-Yahya, P.; Carothers, J.; Zalatan, J. **Portable bacterial CRISPR transcriptional activation enables metabolic engineering in Multiple Bacterial Species.** *Cold Spring Harbor Asia conference on Synthetic Biology 2021*. Oral Presentation
8. Kiattisewee, C.; Dong, C.; Fontana, J.; Carothers, J.; Zalatan, J. **Portable bacterial CRISPR transcriptional activation enables metabolic engineering in *Pseudomonas putida*.** *EBRC Virtual Seminar Series 2020, Engineering Genetic Regulatory Networks*. Oral Presentation

Selected Conferences (Poster Presentations)

1. Kiattisewee, C.⁺; Faulkner, I. D.⁺; Zalatan, J. G.; Carothers, J. M. **Leveraging Aromatic Amines Bioproduction in Stress-resistant *Pseudomonas putida* with CRISPRa/i Gene Regulatory Tools.** *2023 Synthetic Biology: Engineering, Evolution and Design (SEED)*. Poster Presentation as AIChE Foundation registration support and DEI travel awardee
2. Kiattisewee, C.⁺; Faulkner, I. D.⁺; Zalatan, J. G.; Carothers, J. M. **Genome-Wide Gene Regulation by Transcriptional CRISPRa/i Tools in Non-Model Bacteria.** *Genomic Science Program PI Meeting 2023*, invited as new DOE grant awardees. Poster Presentation
3. Kiattisewee, C.⁺; Karanjia, A. V.⁺; Legut, M.; Daniloski, Z.; Koplik, S.; Nelson, J.; Kleinstiver, B. P.; Sanjana, N. E.; Carothers, J. M.; Zalatan, J. G. **Expanding the scope of bacterial CRISPR activation with PAM-flexible dCas9 variants.** *The 5th International Conference on CRISPR Technologies*. Poster Presentation

4. Kiattisewee, C. ⁺; Karanjia, A. V. ⁺; Cardiff, R. ⁺; Alvi, S. S.; Zalatan, J. G. ; Carothers, J. M. **Investigating promoter distance rules for effective bacterial CRISPRa with distinct transcriptional activation mechanisms.** *EBRC Annual Meeting 2022*. Poster Presentation
5. Kiattisewee, C. ⁺; Karanjia, A. V. ⁺; Koplik, S.; Carothers, J. M.; Zalatan, J. G. **Expanding the scope of bacterial CRISPR activation with PAM-flexible dCas9 variants.** *2022 Synthetic Biology: Engineering, Evolution and Design (SEED)*. Poster Presentation (A.V.K. presented on C.K. behalf)
6. Kiattisewee, C.; Dong, C.; Fontana, J.; Sugianto, W.; Karanjia, A.; Peralta-Yahya, P.; Carothers, J.; Zalatan, J. **Portable bacterial CRISPR transcriptional activation enables metabolic engineering in Multiple Bacterial Species.** *The 4th International Conference on CRISPR Technologies*. Poster Presentation.
7. Kiattisewee, C.; Dong, C.; Fontana, J.; Sugianto, W.; Karanjia, A.; Peralta-Yahya, P.; Carothers, J.; Zalatan, J. **Portable bacterial CRISPR transcriptional activation enables metabolic engineering in Multiple Bacterial Species.** *MSDE Symposium 2021: Frontiers in Molecular Engineering*. Poster Presentation
8. Kiattisewee, C.; Dong, C.; Fontana, J.; Sugianto, W.; Karanjia, A.; Peralta-Yahya, P.; Carothers, J.; Zalatan, J. **Portable bacterial CRISPR transcriptional activation enables metabolic engineering in Multiple Bacterial Species.** *EBRC Annual Meeting 2021*. Poster Presentation
9. Kiattisewee, C.; Dong, C.; Fontana, J.; Sugianto, W.; Karanjia, A.; Peralta-Yahya, P.; Carothers, J.; Zalatan, J. **Portable bacterial CRISPR transcriptional activation enables metabolic engineering in Multiple Bacterial Species.** *2021 Synthetic Biology: Engineering, Evolution and Design (SEED)*. Poster Presentation
10. Kiattisewee, C.; Kaidad, A.; Jiarpinitnun, C.; Luanphaisarnnont, T. **Kinetic studies of conjugate addition of amines to allenic and acrylic esters and their correlation with antibacterial activities against *Staphylococcus aureus*.** ACS Asia-Pacific International Chapters Conference 2017, Jeju, South Korea. Student travel grant award and winner of poster presentation competition.

Peer Review Services (and Assisting in Peer-Review)

- Nucleic Acids Research – August 2023 (**Direct invitation to C.K.**)
- Nucleic Acids Research – 4 articles – April 2023 (Assisting J.M.C.), March 2022 (Assisting J.M.C.), December 2020 (Assisting J.G.Z.), and September 2019 (Assisting J.G.Z.)
- Nature Communications – 3 articles – December 2022 (Assisting J.G.Z.), October 2022 (Assisting J.G.Z.), and March 2020 (Assisting J.M.C.)
- ACS Synthetic Biology – 2 articles – October 2023 (Assisting J.G.Z.) and February 2023 (Assisting J.G.Z.)
- Nature Microbiology – February 2024 (Assisting J.M.C.)
- Nature Chemical Biology – November 2023 (Assisting J.M.C.)
- Cell Reports Methods – May 2023 (Assisting J.M.C.)
- Metabolic Engineering Communications – May 2022 (Assisting J.M.C.)
- The CRISPR Journal – June 2020 (Assisting J.G.Z.)
- Microbial Cell Factory – February 2020 (Assisting J.M.C.)
- Biotechnology Journal – March 2018 (Assisting P.C.)

Teaching/Mentoring Experience

- Mentor students to perform Basic Molecular Biology and Microbiology to design and develop CRISPR tool for bacterial engineering: 2 undergraduate students, 1 Master's student, 1 international visiting Master's student and 12 early career Ph.D. students
- Instructor at [SynBio4All](#)'s Beginner Course in Synthetic Biology 2023 – A virtual introductory course for African students interested in Synthetic Biology.
- Co-chair and Panelists in [EBRC Virtual Panels](#) series “Introduction to Graduate School in Engineering Biology” series 2022 – present

- Invited lecturer at Naresuan University, Thailand, Autumn 2022 – Synthetic Biology & Genome-Scale Engineering
 - 3rd Lecture: CRISPR Technologies: Editing & Regulations
 - 4th Lecture: Living Therapeutics
- Teaching Assistant, University of Washington, Autumn 2022 – CHEM 239: Organic Chemistry

Leadership and Services

2023 – <u>Present</u>	“Membership and Engagement Co-Chair” , Engineering Biology Research Consortium Student and Postdoctoral Association (EBRC-SPA)
2024 – <u>Present</u>	Mentor at ASM Future Leaders Mentorship Fellowship (FLMF) Program
2022 – 2023	UW MoES Graduate Student Association (MoES-GSA), Member & Cohort Representative
2021 – 2023	“Membership and Outreach Co-Chair” and “DEI Task Force Liaison”, Engineering Biology Research Consortium Student and Postdoctoral Association (EBRC-SPA)
2023	Panelist at DiscoverBMB Community Day at the ASBMB annual conference
2021 – 2022	UW Graduate School Interdisciplinary Committee (GSIC), as a MoES Student Liaison working on developing new course curriculum for Ph.D. students
2021 – 2022	รายชื่อ SynBio a.k.a. Get Rich with SynBio, a Scientific Communication Series in Thai language on Clubhouse, Thailand Synthetic Biology Consortium
2020 – 2022	Co-founder of the MoES Diversity, Equity, and Inclusion (DEI) Committee – Organizational Subcommittee member
2020 – <u>Present</u>	Member of the EBRC (Engineering Biology Research Consortium) Student and Postdoc Association (SPA): Focus on Roadmapping: Engineering Biology for Climate & Sustainability 2023 , Engineering Biology 2019 Assessment

Honors and Awards

2023	Distinguished Dissertation Award 2023 , <i>Molecular Engineering and Sciences Institute (MoES), University of Washington</i>
2023	Invited to attend ACS BRIDGE Career Kickstarter Conference 2023
2023	ACS Graduate Student and Postdoctoral Scholar Recognition Program 2023, Leadership in Mentoring, one of 21 Graduate Student Recipients
2023	AIChE Foundation registration support and DEI travel award for SEED 2023
2022	Travel Award, Graduate Student Symposium “Mother (Nature) Knows Best: Bonding with Nature’s Proteins”, ACS Meeting Spring 2022, San Diego, USA
2019	Outstanding Thesis Awards 2019 , <i>Faculty of Graduate Studies, Mahidol University</i>
2017	National delegate to participate the Lindau Nobel Laureate Meetings 67th (2017) dedicated to Chemistry, Lindau, Germany

References

- **Jesse G. Zalatan**, (zalatan@uw.edu), Associate Professor
Department of Chemistry, University of Washington, Seattle
- **James M. Carothers**, (jcaroth@uw.edu), Charles W. H. Matthaei Endowed Professor
Department of Chemical Engineering, University of Washington, Seattle
- **Georg Seelig**, (gseelig@uw.edu), Professor
Department of Electrical & Computer Engineering, University of Washington, Seattle
- **Caroline S. Harwood**, (csh5@uw.edu), Gerald and Lyn Grinstein Professor of Microbiology
Department of Microbiology, University of Washington, Seattle