Pimchai Chaiyen

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Vidyasirimedhi Institute of Science and Technology (VISTEC)
Address: 555 Moo 1 Payupnai, Wangchan, Rayong 21210 Thailand

Education:

1997	Ph. D. Biological Chemistry, University of Michigan, Ann Arbor, USA
1992	B.Sc. (First Class Hons) Chemistry, Prince of Songkla University, Thailand

Research and Professional Experience:

2021-present	Associate Editor, ACS Catalysis, American Chemical Society
2018-2022	Visiting Professor, Institute for Integrated Cell-Material Sciences (iCeMS), Institute for Advanced Study, Kyoto University, Japan
2018-2020	Visiting Professor, Biomedical Research Institute, Advanced Industrial Science and Technology (AIST), Tsukuba, Japan
2017-2023	Adjunct Professor, Dept of Biochemistry, Faculty of Science, Mahidol University
2017-present	Professor, School of Biomolecular Science and Engineering, Vidyasirimedhi Institute of Science and Technology (VISTEC)
2009-2017	Professor, Dept of Biochemistry, Faculty of Science, Mahidol University
2005	Associate Prof, Dept of Biochemistry, Faculty of Science, Mahidol University
2001	Assistant Prof, Dept of Biochemistry, Faculty of Science, Mahidol University
1997	Lecturer, Dept of Biochemistry, Faculty of Science, Mahidol University
1994	Teaching assistant in Enzyme Kinetics for graduate students, University of Michigan, Ann Arbor
1993/1996	Teaching assistant in Biochemistry Laboratory for undergraduate and graduate students, University of Michigan, Ann Arbor

Contribution to Thai Policy in Biotechnology

2020-2022	Member of subcommittee for strategic plan for Bio-, Circular, and Green Economy Policy, Government of Thailand
2018-2020	Member of Subcommittee for Bio-Economy section, Eastern Economic Corridor (EEC)
2015-2022	Executive board member, National Centre for Genetic Engineering and Biotechnology (BIOTEC), National Science and Technology Development Agency (NSTDA)
2015-2017	Member of Subcommittee for New Economy under the committees of Thailand's National Reform Steering Assembly

Administration and Leadership Positions:

2023-present	President, Vidyasirimedhi Institute of Science and Technology (VISTEC)
2020-present	Co-founder, BioSynThai Biotechnology Co.
2018-present	Acting Director, Frontier Research Center, Vidyasirimedhi Institute of Science and Technology (VISTEC)
2017-2023	Dean, School of Biomolecular Science and Engineering, Vidyasirimedhi Institute of Science and Technology (VISTEC)
2016-2022	Co-founder, Enzmart Biotech Co.
2011-2015	Deputy Dean for Research, Faculty of Science, Mahidol University
2009-2011	Chair, Dept of Biochemistry, Faculty of Science, Mahidol University
2008-2009	Deputy Chair, Dept of Biochemistry, Faculty of Science, Mahidol University

Awards and Distinctions:

2025	Conference co-chair with Tobias Erb (Max Planck, Marburg) and Carsten Kettner (Beilstein-Institut): Beilstein Enzymology Symposium 2025 "Natural and Synthetic Evolution of Catalysis"
2025	Editorial Board member of Current Opinion in Chemical Biology
2025	Research Excellence Award for "Mechanistic investigation and applications of enzymes capable of degrading phenolic toxicants" from the National Research Council of Thailand (NRCT)
2024	Appointed Editorial Advisory Board of Accounts of Chemical Research, American Chemical Society
2024	Honorary Ph.D. degree (Chemistry) from Prince of Songkla University, Thailand
2023	Excellent Invention Award from NRCT "Biocatalyst for conversion of phenolic compounds to valuable chemicals and pesticide detection technology" from the National Research Council of Thailand (NRCT)
2023	Research Distinction Award for "Mechanistic studies and rational engineering for increasing catalytic capability of a flavin-dependent halogenase" from the National Research Council of Thailand (NRCT)
2021	Appointed Associate Editor of ACS Catalysis, American Chemical Society
2020	Research Excellence Award for "Pyranose 2-oxidase as an efficient biocatalyst for sugar conversion" from the National Research Council of Thailand (NRCT)
2020	Honorable mention - Invention from NRCT "BioVis fermentation unit for high efficiency biogas and biofertilizer production" (2020)
2020	Honorable mention - Invention from NRCT "Smart pesticide detection for food safety"
2019	Outstanding Protein Scientist of Thailand
2019	Distinguished Alumni Lectureship, Department of Biological Chemistry, University of Michigan, Ann Arbor, USA
2017	L'oreal-Unesco Woman in Science Crystal Award for the most accomplished woman scientist in Thailand (Life Science)
2017	First Place in Final Pitch Session "Leaders in Innovation Fellowship" hosted by Royal Academy of Engineering and Newton Fund, UK
2017	Innovation Award for "Protein Markers" from the National Research Council of Thailand (NRCT)
2017	Research Excellence Award for "Serine hydroxymethyltransferase as a malarial drug target" from the National Research Council of Thailand (NRCT)
2016	Received title *TRF Senior Research Scholar* and Research Team Building Grant from The Thailand Research Fund
2016	Project *Bacterial Luciferase as a Gene Reporter* invited to participate in Tech Planter Final Grand Prix, Tokyo (A platform promoted by Leave a Nest Co., Japan, to help science professionals develop business skills)
2016	BioTalk Plenary Award from Biotechnology and Biochemical Engineering Society of Taiwan
2015	Outstanding Alumni Award from Royal Thai Government Scholarship Alumni Association
2015	Outstanding Scientist of Thailand 2015, Foundation for Promotion of Science and Technology under the Patronage of H. M. the King, Thailand
2015	Speaker at TEDx Bangkok 2015
2014	Chair of the Organizing Committee, IUBMB 18th International Symposium on Flavins and Flavoproteins
2013	Received title *TRF Senior Research Scholar* and Research Team Building Grant from The Thailand Research Fund
2012	Outstanding Researcher Award (Chemical Sciences and Pharmacy Section) from the National Research Council of Thailand (NRCT)
2011	Outstanding Alumni Award from Prince of Songkla University
2010	TRF-CHE-Scopus Researcher Award

2010	Taguchi Prize for Outstanding Research Achievement in Biotechnology
2010	Exemplary Lecturer Award from Mahidol University Faculty Senate
2009	Invited to World Economic Forum, Annual Meeting of the New Champions
2009	Faculty of Science Outstanding Lecturer Award (First-Middle Level)
2009	BMB Award from Section of Biochemistry & Molecular Biology, The Science Society of Thailand under the Patronage of H.M. the King, Thailand
2008-2012	Affiliate Fellow of TWAS (Academy of Sciences for the Developing World)
2005	Young Scientist Award, Foundation for the Promotion of Science and Technology under the Patronage of H. M. the King, Thailand
2003	L'oreal-Unesco Fellowship for Woman in Science in Thailand
1998	Murphy Award from Department of Biological Chemistry, University of Michigan, Ann Arbor (for outstanding publication series)
1995	Chrisman Award from Department of Biological Chemistry, University of Michigan, Ann Arbor (for outstanding Ph.D. candidate)
1985-1997	Scholarship from Development and Promotion of Science and Technology Talent Project, Government of Thailand
1989,1993	Dr. Tap Nilaniti Outstanding Graduate Award
1985	Distinguished Student Award from Princess Sirindhorn of Thailand

Publications and Patents: (Details at https://www.vistec.ac.th/chaiyen_p)

>40 Patent applications filed. Five patents granted

>206 publications in leading peer-reviewed international journals;
h-index = 47 (Google Scholar)
Total citations = 7398 (Google Scholar)

Selected publications:

1x Chem Rev; 3xNature Catalysis; 1x Nature Biotechnology; 1xNature Chemical Biology; 1x Nat Biomed Eng; 2x J Am Chem Soc; 5x Angewandte Chemie; 4xPNAS; 1xTiBS; 1x Chemical Science; 1x ACS Catalysis; 1x Chem Catalysis; 2x JACS Au; 25x J Biol Chem.; 16x FEBS J.; 14x Biochemistry; 1x ACS Chem Biol; 2x Chemistry-A European Journal; 2x J Med Chem; 1x J Mol Biol; 2x J Bacteriol; 14x Biochemistry; 1x Biosens Bioelectron.; 1x Anal Chem; 1x ACS-Sensors; 2x Molecular Catalysis; 2x Biotech J; 1x Biotechnology Journal; 2xJournal of Biotechnology; 1x J R Soc Interface.; 5x ChemBioChem; 1x ChemMedChem; 10x Arch. Biochem. Biophys; 2x Journal of Bioetchnology; 3x J. Photochem. Photobiol; 1x Chem Eng Trans.; 2x PLoS One; 4x J. Chem.Edu

Book and Book Chapters

Editor of the Book: The Enzymes, Volume 47.
Flavin-Dependent Enzymes (published on 1st October 2020)

10 chapters in books published by Walter de Gruyter GmbH, Springer-Verlag Berlin-Heidelberg, Wiley-VCH Verlag GmbH & Co, Academic Press, Elsevier, Humana Press (Springer-Nature).

Recognitions from International Communities

>67 Invited lectures at international symposiums and institute overseas (Including four talks at Gordon Research Conferences)
>21 Invited talks at overseas universities
5 Talks at international leading companies (BASF (Germany), Amano (Japan) and Pfizer (USA))

Associate Editor: ACS Catalysis (2021 - present)

Editorial Advisory Board:
-Accounts of Chemical Research (2024 – present)
-ChemBioChem (2021 – 2024)

Editorial Board:
-Current Opinion in Chemical Biology (2025-present)
-Archives Biochemistry and Biophysics (2012-2025)
-eLife (2019-2023)
-The Journal of Biological Chemistry (2012-2022)

Reviewer: Nature Chemical Biology; Nature Communication; Journal of the American Chemical Society (JACS); PNAS; Angewandte Chemie; ACS Catalysis; Chemical Science; eLife; Trends in Biochemical Science; Trends in Biotechnology; The Journal of Biological Chemistry (JBC); Energy Conversion and Management; Acta Crystallographica Section F; Advanced Synthesis & Catalysis; Applied Catalysis A; Applied Environmental Microbiology; Applied Microbiology and Biotechnology; Archives of Biochemistry and Biophysics; Biochemistry; Biochimie; Biochimica Biophysica Acta; Biofuel Bioproduct Biorefinery, Bioresource Technology; Biotechnology Advances; Biotechnology Advances; Biotechnology & Bioengineering; Biotechnology Journal; Briefing in Bioinformatics; Chemistry & Biology; ChemCatChem; FEBS Journal; FEMS Microbiology Letter; Journal of Agricultural and Food Chemistry; Journal of Chemical Education; Journal of Molecular Catalysis B: Enzymatic; Journal of Photochemistry and Photobiology B; Microbial Cell Factory; Catalytic Science and Technology; Current Opinions in Green and Sustainable Chemistry; International Journal of Antimicrobial Agents; ACS-Sustainable Chemistry and Engineering;Molecular Microbiology; Natural Product; Applied Catalysis A; Analytical Chemistry.

International Grant reviewer:
National Science Foundation (NSF) - Chemistry of Life Processes USA;
Austrian Science Fund, Austria;
Deutsche Forschungsgemeinschaft German Research Foundation

Chair of International Symposium:

1. IUBMB, 18th International Symposium on Flavins and Flavoproteins 2014

2. Beilstein Enzymology Symposium 2025 “Natural and Synthetic Evolution of Catalysis”

3. 23rd ISBC (International Society for Bioluminescence and Chemiluminescence) & 21st International Society of Luminescence Spectrometry (ISLS) 2026

4. The 22nd International Symposium on Flavins and Flavoproteins 2027

Contributions to Life Science Innovations

>40 patents filed (five patents granted)
-Cofounder of a Biotech Startup, EnzMart Biotech (www.enzmart.com). The company produces and sells laboratory reagents at competitive prices to local Thai researchers.
-Cofounder of a Biotech Startup, BioSynThai Biotechnology (biosynthai.com). The company develops and operates frontier biotechnologies to support circular economy.

Contributions to Science Applications in Community Development

Developed synthetic biology technology to convert food waste into valuable bioenergy and biochemicals. This was piloted as part of a “Zero Waste” initiative in Nan province, Northern Thailand, with the goal of scaling it into a nationwide, sustainable waste management program. The technology has since matured and is now being implemented commercially through the startup GreenGen Biotechnology (greengenbiotechnology.com).

Also developed a robust enzyme and a user-friendly portable device—together called LUMOS (Luminescence-related Measurement of Specific Detection)—to rapidly and accurately detect pesticide residues in water, food, and environmental samples. LUMOS enables on-site testing that is faster and more cost-effective than laboratory methods. It has been deployed in Nan province, Thailand, where pesticide overuse has contaminated groundwater and food crops, endangering both farmers and consumers. By enabling quick and accurate field detection, LUMOS discourages pesticide overuse and supports the development of green agricultural communities. It also helps screen for pesticide-free produce, promoting food safety. It is being readied for scaled-up implementation in Thailand and other developing countries.

Selected publications

[204] Intasian P*, Kimprasoot N, Trisrivirat D, Chaiyen P*. Synthetic biology for phytohormone production. Current Opinion in Chemical Biology. 2026;90. doi: 10.1016/j.cbpa.2025.102649

[203] Pimviriyakul P*, Anuwan P, Chaiyen P, Wongnate T*. Flavin reductases in two-component systems: Mechanistic insights, structural classification, and biotechnological advances. Biotechnology Advances. 2026;87. doi: 10.1016/j.biotechadv.2025.108779

[200] Watthaisong P, Kantiwiriyawanitch C, Jitkaroon W, Phintha A, Klayparn I, Lawan N, Kamutira P, Sasaki D, Visitsatthawong S, Maenpuen S, Tinikul R, Sucharitakul J, Nishihara R, Niwa K, Nakajima Y, Ohmiya Y, Chaiyen P*. Red-shifted-luciferin analogues and their bioluminescence characteristics. RSC Chemical Biology. 2026;7(1);67-80. doi: 10.1039/d5cb00287g

[199] Chinantuya W, Kungchuai K, Chaiyen P, Maenpuen S*, Tinikul R*. Discovery and biochemical characterization of enzymes completing the 4-hydroxyphenylacetate pathway in Acinetobacter baumannii TH. Journal of Biological Chemistry. 2025;301(12). doi: 10.1016/j.jbc.2025.110917

[196] Chuaboon L, Visitsatthawong S, Sookbampen O, Suthin S, Voss M, Wongnate T, Höhne M, Bornscheuer U. T*, Chaiyen P*. Biocatalytic cascade combining an engineered pyranose 2-oxidase and transaminases for the synthesis of amino sugars. RSC Advances. 2025; 15(39);32600 - 32608. doi: 10.1039/d5ra04556h

[193] Phaisan S, Phintha A, Trisrivirat D, Lawan N, Sucharitakul J, Charoenpol A, Watthaisong P, Tanaka H, Kurisu G, Chaiyen P*. Unique structural features define the decarboxylation activity of a CYP152 fatty acid decarboxylase from Lacicoccus alkaliphilus. Journal of Biological Chemistry. 2025;. doi:10.1016/j.jbc.2025.110397

[192] Prakinee K, Jitkaroon W, Chaiyen P. Flavin-Dependent Halogenases: Emerging Enzymes and New Functions. ChemCatChem. 2025. doi:10.1002/cctc.202500558

[182] Sutthaphirom C, Chaiyen P. Use of xylose reductase as a cofactor enhancing system for in vivo biocatalysis. Methods in Enzymology. 2025;714;379-391. doi:10.1016/bs.mie.2025.01.022

[180] Kantiwiriyawanitch C, Leartsakulpanich U, Chaiyen P, Ruchanok T. Mechanisms and applications of bacterial luciferase and its auxiliary enzymes. Archives of Biochemistry and Biophysics 2025; 765,110307.

[179] Phintha A, Lukowski A L, Chaiyen P. Unlocking the catalytic precision of ligand-controlled enzymatic halogenation. Proc. Natl. Acad. Sci. U.S.A. 2025; 122 (1); e2409479122.

[178] Prakinee K, Chaiyen P. Expanding beyond the capability of nature. Nature Chemical Biololgy 2025; 21: 32–34.

[173] Prakinee K, Phaisan S, Kongjaroon S, Chaiyen P. Ancestral Sequence Reconstruction for Designing Biocatalysts and Investigating their Functional Mechanisms. JACS Au 2024, *in press*.

[170] Kongjaroon S, Lawan N, Trisrivirat D, Chaiyen P. Enhancement of tryptophan 2-monooxygenase thermostability by semi-rational enzyme engineering: a strategic design to minimize experimental investigation. RSC Chemical Biology 5 (10), 989-1001.

[169] Prakinee K, Lawan N, Phintha A, Visitsatthawong S, Chitnumsub P, Jitkaroon W, Chaiyen P. On the Mechanisms of Hypohalous Acid Formation and Electrophilic Halogenation by Non-Native Halogenases. Angewandte Chemie International Edition 2024, 63, e202403858.

[168] Intasian P, Sutthaphirom C, Bodeit O, Trisrivirat D, Kimprasoot N, Jaroensuk J, Bakker B, Klipp E, Chaiyen P. Enhancement of essential cofactors for in vivo biocatalysis. Faraday Discussions 2024; 252, 157-173.

[166] Jaroensuk J, Sutthaphirom C, Phonbuppha J, Chinantuya W, Kesornpun C, Akeratchatapan N, Kittipanukul N, Phatinuwat K, Atichartpongkul S, Fuangthong M, Pongtharangkul T, Hollmann F, Chaiyen P. A versatile in situ cofactor enhancing system for meeting cellular demands for engineered metabolic pathways. Journal of Biological Chemistry 2004; 300 (2),105598.

[163] Phintha A, Chaiyen P. Unifying and versatile features of flavin-dependent monooxygenases: Diverse catalysis by a common C4a-(hydro)peroxyflavin. Journal of Biological Chemistry 2023; 299 (12), 105413.

[154] Phonbuppha J, Tinikul R, Ohmiya Y, Chaiyen P. High Sensitivity and Low-Cost Flavin luciferase (FLUXVc)-based Reporter Gene for Mammalian Cell Expression. Journal of Biological Chemistry 2023; 299(5):104639.

[153] Trisrivirat D, Tinikul R, Chaiyen P. Synthetic microbes and biocatalyst designs in Thailand. Biotechnology Notes 2023; 4, 28-40

[152] Jaroensuk J, Chuaboon L, Chaiyen P. Biochemical reactions for in vitro ATP production and their applications. Molecular Catalysis 2023; 537, 112937.

[149] Schenkmayerova A, Toul M, Pluskal D, Baatallah R, Gagnot G, Pinto GP, Santana VT, Stuchla M, Neugebauer P, Chaiyen C, Damborsky J, Bednar D, Janin YL., Prokop Z, Marek M. Catalytic mechanism for Renilla-type luciferases. Nature Catalysis 2023; 6, 23–38.

[146] Rational and mechanistic approaches for improving biocatalyst performance Phintha A, Chaiyen P. Chem Catalysis 2022, 2(10): 2614-2643.

[141] Prakinee K, Phintha A, Visitsatthawong S, Lawan N, Sucharitakul J, Kantiwiriyawanitch C, Damborsky J, Chitnumsub P, van Pée KH, Chaiyen P (2022) Mechanism-guided tunnel engineering to increase efficiency of a flavin-dependent halogenase. Nature Catalysis 2022 Jun;5:534-44.

[140] Chaiyen P. Pimchai Chaiyen's biography. Biophysical Reviews 2022; Jun;14:613-7.

[138] Watthaisong P, Kamutira P, Kesornpun C, Pongsupasa V, Phonbuppha J, Tinikul R, Maenpuen S, Wongnate T, Nishihara R, Ohmiya Y, Chaiyen P. Luciferin Synthesis and Pesticide Detection by Luminescence Enzymatic Cascades. Angew Chem Int Ed 2022; April 61(16): e202116908

[137] Tinikul R, Trisrivirat D, Chinantuya W, Wongnate T, Watthaisong P, Phonbuppha J, Chaiyen P. Detection of cellular metabolites by redox enzymatic cascades. Biotech J 2022; June 17(6):2100466.

[136] Trisrivirat D, Sutthaphirom C, Pimviriyakul P, Chaiyen P. Dual activities of oxidation and oxidative decarboxylation by flavoenzymes. Chembiochem 2022; June 23(11): e202100666.

[135] Lawan N, Tinikul R, Surawatanawong P, Mulholland AJ, Chaiyen P. QM/MM Molecular Modeling Reveals Mechanism Insights into Flavin Peroxide Formation in Bacterial Luciferase. J Chem Inf Model. 2022 Jan 6. doi: 10.1021/acs.jcim.1c01187.

[130] Watthaisong P, Binlaeh A, Jaruwat A, Lawan N, Tantipisit J, Jaroensuk J, Chuaboon L, Phonbuppha J, Tinikul R, Chaiyen P, Chitnumsub P, Maenpuen S. Catalytic and structural insights into a stereospecific and thermostable Class II aldolase HpaI from Acinetobacter baumannii, J Biol Chem. 2021 Nov; 291(5), 101280.

[128] Intasian P, Prakinee K, Phintha A, Trisrivirat D, Weeranoppanant N, Wongnate T, Chaiyen P*. Enzymes, In Vivo Biocatalysis, and Metabolic Engineering for Enabling a Circular Economy and Sustainability. Chem Rev. 121(17), pp. 10367-10451.

[127] Pimviriyakul P, Jaruwat A, Chitnumsub P*, Chaiyen P*. Structural insights into a flavin-dependent dehalogenase HadA explain catalysis and substrate inhibition via quadruple π-stacking. J Biol Chem. 2021 Aug;297(2):100952.

[124] Pongpamorn P, Kiattisewee C, Kittipanukul N, Jaroensuk J, Trisrivirat D, Maenpuen S, and Chaiyen P. Carboxylic Acid Reductase Can Catalyze Ester Synthesis in Aqueous Environments. Angewandte Chemie - International Edition, 2021, 60(11), pp. 5749–5753.

[122] Teanphonkrang, S, Suginta, W, Sucharitakul, J Sucharitakul, J, Fukamizo, T, Chaiyen, P, Schulte, A. An electrochemical method for detecting the biomarker 4-HPA by allosteric activation of Acinetobacter baumannii reductase C1 subunit. J of Biol Chem. 2021, Jan:296, 100467

[121] Sucharitakul J, Buckel W, Chaiyen P. Rapid kinetics reveal surprising flavin chemistry in the bifurcating electron transfer flavoprotein from *Acidaminococcus fermentans*. J Biol Chem. 2021 296:100124.

[120] Phintha A, Prakinee K, Jaruwat A, Lawan N, Visitsatthawong S, Kantiwiriyawanitch C, Songsungthong W, Trisrivirat D, Chenprakhon P, Mulholland AJ, van Pee KH, Chitnumsub P, Chaiyen P. Dissecting the low catalytic capability of flavin-dependent halogenases. J Biol Chem. 2021 Jan:296:100068.

[112] Trisrivirat D, Lawan N, Chenprakhon P, Matsui D, Asano Y, Chaiyen P. Mechanistic insights into the dual activities of the single active site of L-lysine oxidase/monooxygenase from Pseudomonas sp. AIU 813. 2020 J Biol Chem. 2020 Aug 7;295(32):11246-11261.

[111] Woraruthai T, Kunno J, Pongsopon M, Yansakon K, Phoopraintra P, Chantiwas R, Leartsakulpanich U, Chaiyen P, Wongnate T. Identification and Cultivation of Hydrogenotrophic Methanogens from Palm Oil Mill Effluent for High Methane Production. Int J Energy Res 2020;44:10058-70.

[110] Munkajohnpong P, Kesornpun C, Buttranon S, Jaroensuk J, Weeranoppanant N, Chaiyen P. Fatty Alcohol Production: An Opportunity of Bioprocess. Biofuel Bioprod Bioref 2020;14:986-1009.

[109] Sucharitakul J, Buttranon S, Wongnate T, Chowdhury N P, Prongjit M, Buckel W, Chaiyen P. Modulations of the reduction potentials of flavin-based electron bifurcation complexes and semiquinone stabilities are key to control directional electron flow. FEBS Journal, 2021, 288(3), pp. 1008–1026.

[108] Maenpuen S, Pongsupasa V, Pensook W, Anuwan P, Kraivisitkul N, Pinthong C, Phonbuppha J, Luanloet T, Wijma HJ, Fraaije MW, Lawan N, Chaiyen P, Wongnate T. Creating Flavin Reductase Variants with Thermostable and Solvent-Tolerant Properties by Rational-Design Engineering. ChemBioChem. 2020;21(10):1481-1491.

[107] Pitsawong W, Chenprakhon P, Dhammaraj T, Medhanavyn D, Sucharitakul J, Tongsook C, van Berkel WJH, Chaiyen P, Miller AF. Tuning of pKa values activates substrates in flavin-dependent aromatic hydroxylases. J Biol Chem. 2020 Mar 20;295(12):3965-3981.

[106] Phonbuppha J, Tinikul R, Wongnate T, Intasian P, Hollmann F, Paul CE, Chaiyen P. A Minimized Chemoenzymatic Cascade for Bacterial Luciferase in Bioreporter Applications. Chembiochem 2020 Jul;21(14):2073-79.
(Highlighted as a Front Cover)

[105] Enzymatic reactions and pathway engineering for the production of renewable hydrocarbons. Jaroensuk J, Intasian P, Wattanasuepsin W, Akeratchatapan N, Kesornpun C, Kittipanukul N, Chaiyen P. J Biotechnol. 2020 Feb 10;309:1-19.

[104] Microbial degradation of halogenated aromatics: molecular mechanisms and enzymatic reactions. Pimviriyakul P, Wongnate T, Tinikul R, Chaiyen P. Microb Biotechnol. 2020 Jan;13(1):67-86. doi: 10.1111/1751-7915.13488.

[103] Songsungthong W, Yongkiettrakul S, Bohan LE, Nicholson ES, Prasopporn S, Chaiyen P, Leartsakulpanich U.Diaminoquinazoline MMV675968 from Pathogen Box inhibits *Acinetobacter baumannii* growth through targeting of dihydrofolate reductase. Sci Rep. 2019 Oct 30;9(1):15625. doi: 10.1038/s41598-019-52176-8.

[102] Thongdee N, Jaroensuk J, Atichartpongkul S, Chittrakanwong J, Chooyoung K, Srimahaeak T, Chaiyen P, Vattanaviboon P, Mongkolsuk S, Fuangthong M. TrmB, a tRNA m7G46 methyltransferase, plays a role in hydrogen peroxide

resistance and positively modulates the translation of katA and katB mRNAs in *Pseudomonas aeruginosa.*Nucleic Acids Res. 2019 Sep 26;47(17):9271-9281.

[101] Jaroensuk J, Wong YH, Zhong W, Liew CW, Maenpuen S, Sahili AE, Atichartpongkul S, Chionh YH, Nah Q, Thongdee N, McBee ME, Prestwich EG, DeMott MS, Chaiyen P, Mongkolsuk S, Dedon PC, Lescar J, Fuangthong M.
Crystal structure and catalytic mechanism of the essential m1G37 tRNA methyltransferase TrmD from *Pseudomonas aeruginosa*. RNA. 2019 Nov;25(11):1481-1496. doi: 10.1261/rna.066746.118.

[100] Watthaisong P, Pongpamorn P, Pimviriyakul P, Maenpuen S, Ohmiya Y, **Chaiyen P.** A Novel Chemo-Enzymatic Cascade for Smart Detection of Nitro-and Halogenated Phenols. **Angew Chem Int Ed Engl** 2019;58(38):13254-13258. (Highlighted as “Hot Paper” and “Frontispiece Article”
Highlighted in 10 news outlets.

[99] Pongpamorn P, Watthaisong P, Pimviriyakul P, Jaruwat A, Lawan N, Chitnumsub P, **Chaiyen P**. Identification of a Hotspot Residue for Improving the Thermostability of a Flavin-Dependent Monooxygenase. **ChemBioChem** 2019 Dec;20(24):3020-31.

[98] Jaroensuk J, Intasian P, Kiattisewee C, Munkajohnpon P, Chunthaboon P, Buttranon S, Trisrivirat 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(30):11536-11548.

[97] Ubonprasert S, Jaroensuk J, Pornthanakasem W, Kamonsutthipaijit N, Wongpituk P, Mee-udorn P, Rungrotmongkol T, Ketchart O, Chitnumsub P, Leartsakulpanich U, **Chaiyen P**, Maenpuen S. A flap motif in human serine hydroxymethyl transferase is important for structural stabilization, ligand binding, and control of product release, **J. Biol Chem** 2019;294(27):10490-10502.

[94] Wongnate T, Surawatanawong P, Chuaboon L, Lawan N, **Chaiyen P**. The mechanism of sugar C-H bond oxidation by a flavoprotein oxidase occurs by a hydride transfer before proton abstraction. **Chemistry-A European** 2019; 25(17):4460-4471.

[93] Chuaboon L, Wongnate T, Punthong P, Kiattisewee C, Lawan N, Hsu CY, Lin CH, Bornscheuer U, **Chaiyen P**. One-Pot Bioconversion of L-Arabinose to L-Ribulose in an Enzymatic Cascade. **Angew Chem Int Ed Engl** 2019; 131(8): 2450-2454.

[91] Pimviriyakul P, **Chaiyen P**. A complete bioconversion cascade for dehalogenation and denitration by bacterial flavin-dependent enzymes. **J Biol Chem**. 2018; 293(48):18525-18539.

[90] Pimviriyakul P, Surawatanawong P, **Chaiyen P**. Oxidative Dehalogenation and Denitration by a Flavin-dependent Monooxygenase is Controlled by Substrate Deprotonation. **Chemical Science.** 2018 (9); 7468 – 7482.

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Service to Scientific Organizations:

Thailand:

Grant reviewer: Thailand Science Research and Innovation; National Research Council of Thailand,The Thailand Research Fund (TRF), National Science and Technology Development Agency (NSTDA), National Research Council of Thailand, Commission on Higher Education (CHE), Ministry of Education, Mahidol University

Committee member: Development and Promotion for Science & Technology Talent Project (DPST), National Science and Technology Development Agency (NSTDA)

Subcommittee member: New Economy under the committees of the National Reform Steering Assembly, Government of Thailand

Executive board member, BIOTEC (National Center for Genetic Engineering and Biotechnology, NSTDA (National Science and Technology Development Agency)

Invited Lectures at International Symposiums (outside Thailand):

1. "How the reductase and oxygenase work together in a two-component flavoenzyme, p-hydroxyphenylacetate". 16th International Symposium on Flavins and Flavoproteins, Jaca, Spain, June 2008.
2. Gordon Research Conference 2010: Enzymes, Co-enzymes & Metabolic Pathways "What is necessary for C4a-hydroperoxy-FAD formation in pyranose 2-oxidase reaction?", Waterville Valley Resort, New Hampshire, USA, July, 2010.

3. “Oxygenation mechanism of p-hydroxyphenylacetate hydroxylase, a two-component flavin-dependent monooxygenase”. The 3rd Asia Pacific Protein Association (APPA) Conference, Shanghai, China, May 2011.
4. “Use of Kinetic Isotope Effects and Transient Kinetics to Unravel the Mechanism of H2O2 Elimination from C4a-Hydroperoxy-flavin in Pyranose2-Oxidase”. The IXth European Symposium of The Protein Society. Stockholm, Sweden, May 2011.
5. “Understanding reaction mechanisms of two-component flavin-dependent mono-oxygenases through a model of *p*-Hydroxyphenylacetate hydroxylase”. 17th International Conference on Cytochrome P450, at University of Manchester, UK, June 2011.
6. Gordon Research Conference 2012: "Biocatalysis by Flavoenzymes: From Enzyme Mechanisms to Rational Engineering”, Bryant University, Smithfield, RI, USA, July 2012.
7. "Control and Versatility in Catalysis by Flavin-dependent Enzymes" Enzyme Engineering XXII: Emerging Topics in Enzyme Engineering, Toyama International Conference Center, Toyama, Japan, September 2013.
8. "Mechanisms of Oxygen Activation by Flavin-Dependent Enzymes" at 15th IUBMB - 24th FAOBMB-TSBMB International Conference, Academia Sinica, Taipei, Taiwan, Oct 2014.
9. (Plenary Lecture) "Mechanism and Biocatalysis of Flavin-Dependent Oxygenases" at 9th Joint Conference on Chemistry Program Semarang, Indonesia, Nov 2014.
10. Gordon Research Conference 2015: Enzymes, Co-enzymes & Metabolic Pathways "Oxygenation and Beyond by Two-component Flavin-dependent monooxygenases" at Waterville Valley Resort, New Hampshire, USA, July 2015.
11. “Biotransformation of Aromatic Compounds by Flavin-Dependent Monooxygenases” at the 12th Biotrans, Vienna, Austria, July 2015.
12. “From Mechanisms to Application of Two-component Flavin-Dependent Mono-oxygenases” at Regional meeting of Japan Society for Bioscience, Biotechnology and Agrochemistry, Toyama Prefectural University, Toyama, Japan, Sept 2015.
13. "Two-component Flavin-Dependent Monooxygenases: Challenge and Opportunity" at BallouFest Symposium 2015 in honour of Professor Dr. David P. Ballou, Department of Biological Chemistry, University of Michigan, Ann Arbor, MI, USA, Oct 2015.
14. "Bacterial Luciferase as a Eukaryotic Reporter System" at 19th International Symposium on Bioluminescence and Chemiluminescence, Tsukuba, Japan, May 2016.
15. (Plenary Lecture) "Oxygenation and Beyond by Two-Component Flavin-Dependent Monooxygenases" 21th BEST Conference, National Central University, Taoyuan, Taiwan, June 2016.
16. "From Mechanistic Understanding to Applications of Two-Component Flavin-Dependent Monooxygenases" at 8th European Meeting on OxiZymes, The Netherlands, July 2016.
17. (Plenary Lecture) " Flavin-Dependent Monooxygenases:One Intermediate for Many Reactions " The Fifth International Conference on Cofactors (ICC-05) and Active Enzyme Molecule 2016 (AEM 2016)” Unazuki, Toyama, Japan, Sept 2016.
18. (Plenary Lecture) "Insights into Mechanisms of Flavin-Dependent Monooxygenases and Beyond " 19th International Symposium on Flavins and Flavoproteins, Groningen, The Netherlands, July 2-6, 2017
19. "Beyond Monooxygenation by Flavin-Dependent Enzymes " 20th International Conference on Cytochrome P450: Biochemistry, Biophysics and Biotechnology, Düsseldorf, August 27-31, 2017
20. "From Fundamental to Novel Detection Technology of Flavin-Dependent Monooxygenases" 2018 Protein Science Society of Japan Annual Meeting, 26-28 June 2018, Niigata, Japan.
21. “Novel Enzymatic and Cascade Reactions for Biocatalysis and Biodetection” at EMBO workshop: Enzymes, biocatalysis and chemical biology: The new frontiers, 09 – 12 September 2018 Pavia, Italy. University of Pavia, Italy 9-12 September 2018
22. “Flavin-dependent dehalogease and halogenase”at 25 Year Biochemistry Workshop at Technical University Dresden, Dresden, Germany, 28 September 2018
23. “Versatile Reactions of Two-Component Flavin-Dependent Monooxygenases” at Symposium in honor of Prof. Willem van Berkel “45 Years of Yellow Fever” Department of Biochemistry, Wageningen University, Wageningen, The Netherlands, 2 November

2018

24. "Novel Enzymatic Cascades for Biodetection, Biocatalysis and Biofuel" at Southeast Asia Catalysis Conference (SACC), National University of Singapore, Singapore, 23-24 May, 2019
25. “Enzymatic Cascades for Biocatalysis, Biodetection and Biofuel” at Biotrans 2019, Groningen, The Netherlands. July 7-11, 2019.
26. Invited lecture at 27th FAOBMB & 44th MSBMB Conference and IUBMB Special Symposia, Berjaya Times Square Hotel, Kuala Lumpur, Malaysia. 19-22 August 2019.
27. Invited lecture at International Symposium on the Genetics of Industrial Microorganisms (GIM 2019), Pisa, Italy, 8-11 September 2019.
28. Invited lecture at An Annual Symposium of Japan Association for Bioluminescence and Chemiluminescence (JABC). Tsukuba, Japan. 5 October 2019.
29. Invited lecture at Multistep Enzyme Catalyzed Processes Conference (MECP2020+1), Aachen, Germany (online conference). September 13-16, 2021.
30. Invited lecture at AFOB 2021 Virtual Conference, November 1-4, 2021.
31. Invited lecture at Pacifichem 2021, Hawaii (online conference), December 16-21, 2021.
32. Invited lecture at 21st International Symposium on Bioluminescence and Chemiluminescence & XIX International Symposium on Luminescence Spectrometry, Gijon, Spain, May 31 – June 3, 2022.
33. Keynote lecture at the 17th Conference of the Asian Crystallographic Association (AsCA), October 30 – November 2, 2022
34. Invited speaker at EBRC Global Forum for Engineering Biology 2.0: Review of Synthetic Biology/Engineering Biology National Strategies, Hotel Fort Canning, Singapore
35. Gordon Research Conference 2023: Protein Engineering. "Mechanism-based approach for engineering of flavin-dependent and other related Enzymes " at Bryant University, Rhode Islands, USA, July 23-29, 2023.
36. Invited lecture at Society of Biotechnology Japan at Nagoya University, Nagoya, Japan, September 4, 2023
37. Invited lecture at Beilstein Enzymology Symposium, Rudesheim, Germany, September 12 -14, 2023
38. Invited lecture at ECI Enzyme Engineering XXVII, Singapore, October 1-5, 2023
39. Invited lecture at Asian Synthetic Biology Association Meeting 2023, Awaji Yumebutai International Conference Center, December 12-16, 2023.
40. Invited lecture at Faraday Discussion, Royal Society of Chemistry, Burlington House, London, U.K., May 22-24, 2024
41. Invited lecture at the XXII International Symposium of Bioluminescence and Chemiluminescence (ISBC) and the XX International Symposium of Luminescence Spectroscopy (ISLS), Foz do Iguaçu, Brazil, June 3-7, 2024.
42. Invited lecture at 21st International Flavins and Flavoproteins Symposium, Atlanta, Gorgia, USA. July 15-19, 2024.
43. Plenary lecture at Korean Society for Biotechnology and Bioengineering (KSBB) International Symposium, Jeju Island, Republic of Korea. September 25-27, 2024.
44. Invited lecture at the first SynCell Global Summit: Building a Synthetic Cell Together Shenzhen, China, October 23-25, 2024.
45. Invited lecture at 2nd Asia-Pacific Enzyme Technology Symposium, Hanoi, Vietnam, October 25, 2024
46. Invited lecture at Asian Synthetic Biology Association, Hotel Fort Canning, Singapore, January 6-10, 2025

47. Invited lecture at The Future of Asia SynCell, Guangming Tianan Cloud Valley, Guangming, Shenzhen, China, July 10-11, 2025
48. Keynote Lecture at 10th Asia-Pacific Congress on Catalysis (APCAT-10), Suntec Convention Centre, Singapore, August 4-7, 2025.
49. Invited lecture at Beilstein Enzymology Symposium 2025: Natural and Synthetic Evolution of Catalysis, Hotel Jagdschloss Niederwald, Rudesheim, Germany, September 9-11, 2025
50. Opening Plenary Lecture at the Enzyme Engineering XXVIII Conference, Marienlyst Strandhotel, Helsingør, Denmark, October 19-24, 2025
51. Invited lecture at the Asian Synthetic Biology Association Meeting (ASBA 2025), Parnas Hotel, Jeju, Korea.

Lectures at Academic Institutes Overseas:

1. University of Pavia, Italy. June 12, 2006.
2. Wake Forest University, Winston-Salem, North Carolina, USA. July 2010,
3. BioMedical Research Institute, AIST, Tsukuba, Ibaraki, Japan. September 2013
4. Institute of Biochemistry, University of Greifswald, Greifswald, Mecklenburg-Vorpommern, Germany. May 2014.
5. The Max Planck Institute (MPI) for Terrestrial Microbiology, Marburg, Germany. May 2014
7. BioMedical Research Institute, AIST, Tsukuba, Ibaraki, Japan. Sep 2015
8. University of Bristol, Department of Chemistry, UK, March 2017
9. University of Manchester, Manchester Institute of Biotechnology, UK, March 2017
10. Laboratory of Molecular Biology (LMB), Cambridge, UK, March 2017
11. Institute for Integrated Cell-Material Sciences (iCeMS), 29 June 2018, Kyoto, Japan
12. Department of Experimental Biology & RECETOX, Faculty of Science, Masaryk University, Brno, Czech Republic, 1 November 2018
13 Department of Chemistry, University of California, Berkeley, CA, USA 23 April 2019.
14. Department of Biological Chemistry, University of Michigan, Ann Arbor, USA 25 April 2019.
15. Institute of Biomedical Science, AIST Tsukuba, Japan 7 October 2019.
16. Technical University of Graz, Graz, Austria, 8 June, 2022.
17. University of Illinois, Urbana-Champaign, 19 August 2022.
18. University of Osaka, Osaka, Japan, September 1, 2023
19. Denmark Technical University, Biosustain Institute, September 18, 2023
20. A-STAR Singapore Institute of Food and Biotechnology Innovation, Singapore, October 6, 2023
21. School of Engineering, Ewha Womans University, Seoul, Republic of Korea, September 23, 2024

Lectures at Companies Overseas:

1. BASF-The Chemical Company, Ludwigshafen, Germany. May 2014
2. R&D Headquarter, Amano Enzyme, Gifu, Japan. September 2014, 2016 and September 2023
3. Pfizer research center, Groton, USA July 2024