Sakda Khoomrung, PhD 13/05/2025

- Siriraj Center of Research Excellence for Metabolomics and Systems Biology (SiCORE-MSB),
- Department of Biochemistry, Siriraj Hospital
- Siriraj Metabolomics and Phenomics Center (SiMPC), Siriraj Hospital

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https://metsysbio.com/

Personal information

Place of birth: Chumphon, Thailand
Citizenship: Thai, Swedish

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SUMMARY

I hold an MSc in Chemistry from Prince of Songkla University, Thailand (2006), and a PhD in Chemistry from Karl-Franzens University, Austria (2011). Following postdoctoral (2011-2012) and project leadership roles in metabolomics at Chalmers University of Technology (2013-2017), I co-founded and co-directed the Chalmers Metabolomics Centre (now the Chalmers Mass Spectrometry Infrastructure), providing services nationally and internationally (https://www.chalmers.se/en/infrastructure/cmsi/).

Since joining Siriraj Hospital, Mahidol University in 2017 (Associate Professor, 2019), I have led a research team of over 20 people, establishing a thriving metabolomics and systems biology program and directing the SiCORE-MSB (https://metsysbio.com/). My research focuses on developing innovative approaches to understand cellular metabolism and disease, integrating advanced wet-lab techniques (mass spectrometry, ion mobility mass spectrometry, mass spectrometry imaging) with cutting-edge bioinformatic tools. This work addresses a wide range of biological and medical questions, including research in chronic kidney disease, aging, cancers, skin diseases, precision medicine, and natural products. My contributions include over 50 publications (h-index 21), mentorship of numerous postdoctoral researchers and graduate students, and numerous national and international awards and grants. I serve as an Associate Editor for a computational and structural biotechnology journal and review for several others. I also co-founded and serve as Secretary of the Thailand Metabolomics Association (https://thailand-metabolomics.org/).

Educations & trainings

2011 – 2012:	Post Doc; Systems and Synthetic Biology, Chalmers University of Technology, Sweden (Supervisor: Prof. Jens Nielsen)
2007 - 2011:	Dr. rer. nat. (Ph.D.) in Chemistry; Karl-Franzens University, Austria (Supervisor: Uni.-Prof. Kevin A. Francesconi)
2003 - 2006:	M. Sc. in Analytical Chemistry**;** Prince of Songkla University, Thailand
2004:	Diploma (Environmental Analysis); Technical University of Denmark, Denmark
1997 - 2001:	B.Sc. in education (Chemistry); Prince of Songkla University, Thailand

Positions

2023-	**Director:** SiCORE-MSB
2019-	**Assoc. Prof.**: Department of Biochemistry, Siriraj Hospital, Thailand
2018-	**Instructor**; Department of Biochemistry, Siriraj Hospital, Thailand
2017-2020:	**Visiting researcher**: Chalmers University of Technology, Sweden
2019 (Jan -Fab):	**Visiting researcher**; Department of Biomedical Informatics, University of Arkansas for Medical Sciences, USA
2017- 2018:	**Instructor**; Center of Applied Thai Traditional Medicine, Siriraj Hospital, Thailand
2013-2017:	**Project leader**; Systems and Synthetic Biology, Chalmers University of Technology, Sweden
2016:	**Visiting scholar;** Center of Applied Thai Traditional Medicine, Siriraj Hospital

2013- 2015: **Co-founder and co-director;** Chalmers Metabolomics Centre (later known as Chalmers Mass Spectrometry Infrastructure), Gothenburg, Sweden
2011 2013: **Post Doc**; Systems and Synthetic Biology, Chalmers University of Technology, Sweden
2007- 2011: **PhD student**; Institute of Chemistry, Karl-Franzens University of Graz, Austria
2006-2007: **Research assistant**; Pilot Plant Development and Training Institute, King Mongkut's University of Technology Thonburi, Bangkok, Thailand
2001-2003: **Research assistant**; King Mongkut's Institute of Technology Ladkrabang, Thailand

Awards/Honors

2023: Best poster presentation from PMU-B Brainpower Congress 2023: Frontier Research to Future Industries by I conNEXT with U", Hua Hin, Thailand
2023: Research excellent award (pre-clinic) from Faculty of Medicine Siriraj Hospital (รับพระราชทานรางวัลจากสมเด็จพระกนิษฐาราชเจ้า กรมสมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี)
2019: Young research Grant from the Thailand Research Fund (ทุนสงเสริมนักวิจัยรุ่นใหม่จาก สกว)
2016: Visiting scholar at Faculty of Medicine Siriraj Hospital, Mahidol University
2015: Wallenberg foundation: Travel grant for the metabolomics workshop, Imperial College London, UK
2014: Wallenberg foundation: Travel grant for the 10th metabolomics annual meeting, Tsuruoka, Japan
2014: Wallenberg foundation: Travel grant for the AMBC2014, Bangkok, Thailand
2013: Wallenberg foundation: Travel grant for the 9th metabolomics annual meeting, Glasgow, Scotland
2012: Wallenberg foundations: travel grant for the LipidMaps annual meeting CA, USA
2007 –2010: ÖAD Austrian exchange service program, fellowship for doctoral study, Austria
2003 –2005: Postgraduate Education and Research Program in Chemistry (master degree), Thailand
2004: ASEM-DUO-Denmark fellowship program (scholarship for exchange student program), Denmark

Position of Trust

2024 **Scientific Organizing Committee** for the 20th Annual Conference of the Metabolomics Society 16-20 June, 2024, Osaka, Japan.
2019- **Founding member and Secretary** of Thailand Metabolomics Society, Thailand
2019 **International committee member** of the 16th Annual Conference of the metabolomics Society 2020, Shanghai, China
2019 **Member** of the American Chemical Society, USA

Key Grants

2025-2026 **Siriraj Center of Research Excellence in Metabolomics and Systems Biology (1.6 m THB)**
PI: Dr Sakda Khoomrung
Funder: Faculty of Medicine Siriraj Hospital, Mahidol University

2025-2026 **The Development of Low FODMAP diets for irritable bowel syndrome patients (3.892 MTHB)**
PI: Dr. Waraporn Sorndech, **Dr. Sakda Khoomrung (Co-investigator)**
Funder: Thailand Institute of Scientific and Technology Research (TISTR)

2025-2026 **Development of IM-MS and GCxGC-TOFMS lipidomics for early detection of patients with diabetic kidney disease (3,000,000 MTHB)**
PI: Dr. Sakda Khoomrung
Funder: Mahidol University (Fundamental Fund: fiscal year 2023 by National Science Research and Innovation Fund (NSRF).

2024-2026 **The Metabolomics of Aging in Thai population (1.5 mTHB)**
PI: Dr. Sakda Khoomrung
Funder: Faculty of Medicine Siriraj Hospital, Mahidol University

2024-2026 **Scholarship for Ph.D. 2566 (2023) (0.6 mTHB)**
PI: Dr. Sakda Khoomrung
Funder: Mahidol University

2024-2027 **Searching for pharmacologically active compounds for drug development (3 years, 7.5 mTHB);** Main-PI: Prof. Dr. Prasat Kittakoop
Sub-Project 4: Cutting-edge mass spectrometry to deepen the metabolomics study of Mitragyna speciosa (3 years, 1.8 mTHB), Sub-PI: Dr. Sakda Khoomrung
Funder: National Research Council of Thailand (NRCT)

2024-2027 **Mulitomics tracking Biosynthetic Pathways of Mallotus spodocarpus Cyclic Peptides (3 years: 4.9 mTHB)**
PI: Dr. Sakda Khoomrung
Funder: PERCH-CIC

2024-2025 **Siriraj Center of Research Excellence in Metabolomics and Systems Biology (1 m THB)**
PI: Dr Sakda Khoomrung
Funder: Faculty of Medicine Siriraj Hospital, Mahidol University

2023-2024 **National Higher Education Science Research and Innovation Policy Council (NXPO), 5 mTHB;** Program Management Unit for Human Resources & Institutional Development, Research and Innovation (PMU-B)
PI: Development of Ion mobility-mass spectrometry and artificial intelligence for medical metabolomics to aid precision medicine in patients with kidney diseases

2022-2023 **Mahidol University (Fundamental Fund: fiscal year 2023 by National Science Research and Innovation Fund (NSRF): 1.34 mTHB**
PI: Development of deep learning for metabolomics data analysis of patients with chronic kidney disease

2022-2025 **National Higher Education Science Research and Innovation Policy Council (NXPO), 3.29 mTHB);** Program Management Unit for Human Resources & Institutional Development, Research and Innovation (PMU-B)
PI: The use of three-dimensional convolutional neural network (3DCNN) in combination with quantum chemistry and IM-MS for accurate compound identifications and properties predictions of isomeric lipids

2022-2024 **Ministry of Higher Education, Science, Research and Innovation (MHESI),**
2.4 million THB
PI: The study of foot-skin microbiome and metabolomics of Thai naval cadets with pitted keratolysis

2021-2024 **Center of Excellent for Innovation in Chemistry (PERCH-CIC), 3.55 mTHB**
PI: Metabolomics and systems biology to identify novel bioactive metabolites and the study biosynthesis of pyranonaphthoquinone metabolites in Ventilago harmandiana

2021-2024 **PMUB Organizational Bridging Found: S&T 2564, program 16, 45 mTHB**
Co-investigator: High-Quality Manpower and Institutional Development through Collaboration on Innovative Bioresources in Biorefinery, Metabolomics of Natural Products, and Materials for Sustainability

2020-2022 **Faculty of Medicine Siriraj Hospital, Mahidol University (0.49 mTHB)**
PI: Integrated Metabolomics and Transcriptomics of Lingzhi (*Ganoderma lucidum*)

2020-2021 **Center of Excellent for Innovation in Chemistry (2.7 mTHB)**
PI: Development of comprehensive MS- and NMR-based metabolomics platform for biomarker discovery of disease: A case study for the diagnosis of various types of CKD

2020-2023 **Faculty of Medicine Siriraj Hospital, Mahidol University (2.7 mTHB)**
PI: The study of foot-skin microbiome and metabolomics of Thai naval cadets with pitted keratolysis

2019-2022 **Mahidol University (3.34 mTHB/year)**
PI: Development of a comprehensive MS- and NMR-based metabolomics platform to support the development of precision medicine: The first example for the diagnosis of various types of CKD

2019-2021 **CPF Food Research and Development Center (3.9 mTHB)**
PI: Metabolomics and microbiome in human affected by Asiatic juice and fiber added Asiatic juice

2019-2021 **Thailand research fund: Young research Grant (0.6 mTHB)**
PI: Development of a comprehensive MS- and NMR-based metabolomics platform for the diagnosis of various types of CKD

2018–2021 **Center of Excellent for Innovation in Chemistry (PERCH-CIC), 4.02 mTHB**

PI: Genome-wide association studies with metabolomics of *Ventilago harmandiana*

2012–2020 **BioVacSafe**, **Innovative Medicines Initiative, EU grant 726 KEUR (27 mTHB)**
Co-PI for WP5: Metabolomics of fluad and stamaril
Co-PI for WP7: Data management

PI = Principal Investigator

Editorial Activities:
Editor roles
Associate Editor 2023: Computational and Structural Biotechnology Journal, Since November 2023-
Review Editor: Frontiers in Chemistry (organic chemistry), 2021-
Reviewer

- Analytical Chemistry
- Scientific Reports
- Briefing in bioinformatics
- Journal of food composition and analysis
- Metabolomics
- Frontiers in nutrition
- Frontiers in pharmacology
- Frontiers in plan science
- Frontiers in Nutrition
- Journal of proteome research
- Frontier Oncology
- iScience
- Nature Communications
- Advanced Science
- Npj Biofilms and Microbiomes
- Artificial Intelligence in Medicine
- Computational and Structural Biotechnology Journal
- Npj Science of Food

Publication/ conference presentations
Google scholar ID: Sakda Khoomrung Google citations
Research papers in international journals with peer-reviewed, H-index of 21 (Scopus)

54 : Research articles in peer reviewed journal
6 : Review articles in peer reviewed journal

1. Wisanpitayakorn P, Konsue A, Sartyoungkul T, In-On A, Sirivatanauksorn Y, Gang D, Kittakoop P, **Khoomrung S**[*]. *Spatial Mapping of Stereoisomeric and Isobaric Alkaloids in Mitragyna speciosa Tissues by High-Resolution DESI-cIM-MS*. Under review.
2. Thamlikitkul L, Wanichthanarak K, Manocheewa S, Limjiasahapong S, Phonsatta N, Thangvichien S, Panya A, Sirivatanauksorn Y, Poungvarin N, **Khoomrung S***. (2025) Plasma Metabolomic Analysis in Thai EGFR-mutated Non-Small Cell Lung Cancer Patients. (Submitted).
3. Sangwongchai W, Wanichthanarak K, In-on A, Natee S, Champasri C, Sa-ingthong N, Beckles DM, **Khoomrung S**, Thitisaksakul M*. (2025) *Unveiling distinct storage composition and starch properties in developing indica rice grains via transcriptional profiling and enzymatic activity analysis*. Submitted.
4. Manokasemsan W, Jariyasopit N, Wanichthanarak K, Poungsombat P, Kurilung A, Limjiasahapong S, Thapa K, Sirivatanaukson Y, Ruksasuk S, Srithongkul T, Kitiyakara C, **Khoomrung S***. (2025) *LC-MS/MS Identifies Elevated Imidazole Propionate and Gut-Derived Metabolite Alterations in Peritoneal Dialysis*. Submitted.

5. Mathema V.B., Jariyasopit N, Phochmak T, Wanichthanarak K, Werayachankul T, Sathirapongsasuti N, ChagKitiyakara C, Sirivatanauksorn Y, **Khoomrung S*.** (2025) *CRISP II: Leveraging Deep Learning for Multigroup classification in GC×GC-TOFMS of end-state kidney disease patients.* Submitted.
6. Jariyasopit N, Phochmak T, Manocheewa S, Wanichthanarak K, Limjiasahapong S, Kleebkomut N, Sirivatanauksorn Y, Sirivatanauksorn V, Phrommintikul A, Chattipakorn N, Chattipakorn S*, **Khoomrung S*.** (2025) *Higher Plasma Kynurenine to Tryptophan Ratio Correlates with Increased Incidence of Mild Cognitive Impairment in Treated Metabolic Syndrome Patients.* Submitted.
7. Leeyaphan C, Poungsombat P, O-Thong S, Yenyuwadee S, Bunyaratavej S, Kulthanan K, Pattanaprichakul P, Jirawattanadon P, Munprom K, Jariyasopit N, Srisawat C, Ajawatanawong P, Sutheeworapong S, Sirivatanauksorn Y, **Khoomrung S***. (2025) *Microbial Insights into Pitted Keratolysis: Linking Skin Microbiome to Lesion Severity and Malodor.* Submitted.
8. Kurilung A, Limjiasahapong S, Wanichthanarak K, Manokasemsan W, Khwanta Kaewnarin, Duangkumpha K, Manocheewa S, Tansawat R, Chaiteerakij R, Nookaew N, Sirivatanauksorn Y, **Khoomrung S*.** (2025) *LC-QTOF-MS^{E} with MS^{I}-Based Precursor Ion Quantification and SiMD-Assisted Identification Enhances Human Urine Metabolite Analysis*. Comput. Struct Biotechnol. 27:3079-3089.
9. Saxena K*, Andersson R, Widlund P.O., **Khoomrung S**, Hanzén S, Nielsen J, Kumar N, Molin M, Nyström T*. (2025) Perturbations in L-serine metabolism regulates protein quality control through sensor of retrograde response pathway Rtg2 in *S. cerevisae.* In press in J. Biol. Chem.
10. Indrati N, Phonsatta N, Poungsombat P, **Khoomrung S**, Sumpavapol P*, Atikorn P*. (2025). *Investigation of Southern Thailand sweet pickle mango metabolic profiles related to deterioration.* Food Chemistry 478: 143663.
11. Yabueng N$^{\#}$, Sansupa$^{\#}$ C, Noirungsee N, Kraisitnitikul P, Chansuebsri S, Janta R, **Khoomrung S**, Terd Disayathanoowat T*, Chantara S* (2025) *Characterization of Airborne Microbial Communities in Northern Thailand: Impacts ofSmoke Haze Versus Non-Haze Conditions.* Environ. Pollut. 364: 125302.
12. Wisanpitayakorn P, Jariyasopit N, Duangkumpha K, GOH-J X, Palmer ME, Sirivatanauksorn Y, **Khoomrung S***. (2024) *Multi-Pass Arrival Time Correction in Cyclic Ion Mobility Mass Spectrometry for Imaging and Shotgun lipidomics.* Accepted in ACS Measurement Science Au. **(Selected and the front cover)**
13. Sureram S, Chutiwitoonchai N, Pooprasert T, Sangsopha W, Limjiasahapong S, Jariyasopit N, Yongyut Sirivatanauksorn Y, **Khoomrung S**, Mahidol C, Ruchirawat S, Kittakoop P. (2024). *Discovery of procyanidin condensed tannins of (−)-epicatechin from Kratom, Mitragyna speciosa, as virucidal agents against SARS-CoV-2†*. Int. J. Biol. Macromol. 273: 133059.
14. Manokasemsan W, Jariyasopit N, Poungsombat P, Kaewnarin K, Kwanjeera Wanichthanarak K, Kurilung A, Duangkumpha K, Limjiasahapong S, Pomyen Y, Chaiteerakij R, Tansawat R, Srisawat C, Sirivatanaukson Y, Sirivatanauksorn V, **Khoomrung S***. (2024) *Quantifying fecal and plasma short-chain fatty acids in healthy Thai individuals*. Comput. Struct Biotechnol. 23: 2163–2172.
15. Kurilung A, Kaewnarin K, Wisanpitayakorn P, Jariyasopit N, Wanichthanarak K, Sartyoungkul S, Chee Wong S-C, Limjiasahapong S, Sathirapongsasuti N, Kitiyakara C, Sirivatanauksorn Y, **Khoomrung S***. (2024) *Measurement of Very Low-Molecular Weight Metabolites by Traveling Wave Ion Mobility and Its Use in Human Urine Samples.* J. Pharm. Anal. 14(5): 100921.
16. Wisanpitayakorn P, Sartyoungkul S, Kurilung A, Sirivatanauksorn Y, Visessanguan W, Sathirapongsasuti N, **Khoomrung S*** (2024) *Accurate Prediction of Ion Mobility Collision Cross Section using Ion's Polarizability and Molecular Mass with Limited Data.* J. Chem. Inf. Model. 64 (5), 1533-1542. **(Selected as the front cover)**.
17. Wanichthanarak K, In-on A, Fan S, Fiehn O, Wangwiwatsin A*, **Khoomrung S***. (2024) *Data processing solutions to render metabolomics more quantitative: case studies in food and clinical metabolomics using Metabox 2.0.* GigaScience 13, 1-14.
18. Thongkongkaew T*, Jariyasopit N, **Khoomrung S**, Siritutsoontorn S, Jitrapakdee S, Kittakoop P, Somsak Ruchirawat S. (2023*) Anti-Xanthine Oxidase Inhibitors, 5′-Hydroxyhericenes A-D, from the Edible Mushroom Hericium erinaceus and Structure Revision of* 3-[2,3-Dihydroxy-4-(hydroxymethyl)tetrahydrofuran-1-yl]-pyridine-4,5-diol. ACS Omega 8 (48): 46284–46291.

19. Suta S, Ophakas S, Manosan T, Honwichit O, Suvimol Charoensiddhi, Apinya Surawit, Pongkunakorn T, Pumeiam S, Mongkolsucharitkul P, Pinsawas B, Sutheeworapong S, Puangsombat P, **Khoomrung S**, Mayurasakorn K*. (2023) *Influence of Prolonged Whole Egg Supplementation on Insulin-like Growth Factor 1 and Short-Chain Fatty Acids Product: Implications for Human Health and Gut Microbiota.* Nutrients. (15): 4804.
20. Suta S, Surawit A, Mongkolsucharitkul P, Pinsawas B, Manosan T, Ophakas S, Pongkunakorn T, Pumeiam S, Sranacharoenpong K, Sutheeworapong S, Poungsombat P, **Khoomrung S**, Akarasereenont P, Thaipisuttikul I , Suktitipat B, Mayurasakorn K*. (2023) *Prolonged Egg Supplement Advances Growing Child's Growth and Gut Microbiota*. Nutrients. 24;15(5):1143. doi: 10.3390/nu15051143.
21. Wanichthanarak K, Nookaew I, Pasookhush P, Wongsurawat T, Jenjaroenpun P, Leeratsuwan N, Wattanachaisaereekul S, Visessanguan W, Sirivatanauksorn Y, Nuntasaen N, Kuhakarn C, Reutrakul V, Ajawatanawong P*, **Khoomrung S***. (2023) *Revisiting Chloroplast Genomic Landscape and Annotation towards Comparative Chloroplast Genomes of Rhamnaceae*. BMC Plant Biology 23(1) 1-22.
22. Jariyasopit N, Limjiasahapong S, Kurilung A, Sartyoungkul S, Wisanpitayakorn P, Nuntasaen N, Kuhakarn C, Reutrakul V, Kittakoop P, Sirivatanauksorn Y, **Khoomrung S***. (2022) *Travelling Wave Ion Mobility-derived Collision Cross Section Database for Plant Specialized Metabolites: An Application to Ventilago harmandiana* Pierre. J. Proteome Res. 21(10): 2481. **(Selected as the front Cover)**.
23. Duangkumpha K, Jariyasopit N, Wanichthanarak K, Dhakal E, Wisanpitayakorn P, Thotsiri S, Sirivatanauksorn Y, Kitiyakara C, Sathirapongsasuti N, **Khoomrung S***. (2022) *GC×GC-TOFMS metabolomics analysis identifies elevated levels of plasma sugars and sugar alcohols in diabetic mellitus patients with kidney failure.* J. Biol. Chem. 298 (10): 102445.
24. Indrati N, Sumpavapol P, Phonsatta N, Poungsombat P, **Khoomrung S**, and Panya A. (2022). *Metabolic profiles alteration of Southern Thailand traditional sweet pickled mango during the production process.* Frontiers in Nutrition. doi: 10.3389/fnut.2022.934842
25. Indrati N, Sumpavapol P, Samakradhamrongthai RS, Phonsatta N, Poungsombat P, **Khoomrung S**, Panya A. (2022) *Volatile and non-volatile compound profile of commercial sweet pickled mango* (*Ma-Muang Bao Chae Im*) *and its correlation with consumer acceptance*. J. Food Sci. Technol. 57: 37603770.
26. Mathema VB, Duangkumpha K, Wanichthanarak K, Jariyasopit N, Dhakal E, Sathirapongsasuti N, Kitiyakara C, Sirivatanauksorn Y, **Khoomrung S*.** (2022) CRISP: *A Deep Learning Architecture for GC×GC-TOFMS Contour ROI Identification, Simulation, and Analysis in Imaging Metabolomics*. Brief. Bioinform. 23(2): 1-7. **Selected as research excellent award in 2023 by Siriraj Hospital**
27. Anekthanakul K, Manocheewa M, Chienwichai K, Poungsombat P, Limjiasahapong S, Wanichthanarak K, Jariyasopit N, Mathema VB, Kuhakarn C, Reutrakul V, Phetcharaburanin J, Panya A, Phonsatta N, Visessanguan W, Pomyen Y, Sirivatanauksorn Y, Worawichawong S, Sathirapongsasuti N, Kitiyakara C*, **Khoomrung S*.** (2021) *Predicting of Lupus Membranous Nephritis using Reduced Picolinic Acid to Tryptophan Ratio as a Urinary Biomarker*. iScience. 24(11): 103355
28. Kaewnarin K, Limjiasahapong S, Jariyasopit N, Anekthanakul K, Kurilung A, Chee Wong S-C, Sirivatanauksorn Y, Visessanguan W, **Khoomrung S*.** (2021) *High-Resolution QTOF-MRM for Highly Accurate Identification and Quantification of Trace Levels of Triterpenoids in Ganoderma lucidum* Mycelium. J. Am. Soc. Mass Spectrom Chem. 32:2451-2462. **(Selected as the front cover)**.
29. Jariyasopit N, Khamsaeng S, Panya A, Vinaisuratern P, Metem P, Asawalertpanich W, Visessanguan W, Sirivatanauksorn V, **Khoomrung S***. (2021) *Quantitative Analysis Nutrient Metabolite Compositions of Retail Cow's Milk and Milk Alternatives in Thailand.* J. Food Compos. Anal. 97: 103785.
30. Limjiasahapong S, Kaewnarin K, Jariyasopit N, Hongthong S, Nuntasaene N, Robinson JL, Nookaew I, Sirivatanauksorn Y, Kuhakarn C, Reutrakul V, **Khoomrung S*.** (2021) *UPLC-ESI-MRM for absolute*

quantification and MS/MS structural elucidation of six specialized pyranonaphthoquinone metabolites from Ventilago harmandiana. Front. Plant Sci. 11, 2038.

31. Kenneth H, Jiradej M, Robinson JL, **Khoomrung S**, Trairak P*. (2020) *Deep Proteomic Deconvolution of Interferon and Hepatitis B Effects on a Hepatoblastoma Cell Line*. ACS Omega. 16:16796-16781.
32. Liu Y, Liu Q, Krivoruchko A, **Khoomrung S**, Nielsen J*. (2020) *Engineering yeast phospholipid metabolism for de novo oleoylethanolamide production*. Nat Chem Biol. 16:197-205.
33. **Khoomrung S***, Nookaew I, Sen P, Olafsdottir TA, Persson J, Moritz T, Andersen P, Harandi A, Nielsen J*. (2019) *Metabolic profiling and compound-class identification reveal alterations in serum triglyceride levels in mice immunized with human vaccine adjuvant Alum*. J. Proteome Res. 19: 269-278. **(Selected as the front cover)**
34. Jariyasopit N, Tung P, Su K, Halappanavar S, Evans GJ, Su Y, **Khoomrung S**, Harner T*. (2019) *Polycyclic Aromatic Compounds in Urban Air and Associated Inhalation Cancer Risks: A Case Study Targeting Distinct Source Sectors.* Environ. Pollut. 252: 1882-1891.
35. Jeennor S, Anantayanon J, Panchanawaporn S, **Khoomrung S**, Chutrakul C, Laoteng K*. (2019) *Reengineering Aspergillus oryzae to enhance dihomo-gamma linolenic acid production using integrative approach*. Gene. 706: 106-114.
36. Wanichthanarak K, Jeamsripong S, Pornputtapong N, **Khoomrung S*.** (2019) *Accounting for biological variation with linear mixed-effects modelling improving quality of clinical metabolomics data*. Comput. Struct Biotechnol. J. 17: 611-618.
37. Guo Z, **Khoomrung S,** Nielsen J, Olsson L*. (2018) *Changes in lipid metabolism convey acid tolerance in Saccharomyces cerevisiae.* Biotechnol Biofuels. 11 (1):297.
38. Rodriguez A, Chen Y**, Khoomrung S**, Özdemir E, Borodina I, Nielsen J*. (2017) *Comparison of the metabolic response to over-production of p-coumaric acid in two yeast strains*. Metab. Eng. 44: 265-272.
39. Fletcher E, Feizi A, Bisschops MMM, Hallström BM, **Khoomrung S,** Siewers V, Nielsen J*. (2017) *Evolutionary engineering reveals divergent paths when yeast is adapted to different acidic environments*. Metab. Eng. 39: 19-28.
40. Olafsdottir TA, Lindqvist M, Nookaew I, Andersen PL, Maertzdorf J, Persson J, Weiner J, Zhang Y, Anderson J, **Khoomrung S,** Sen P, Agger EM, Coler R, Carter D, Meinke A, Kaufmann SHE, Reed SG, Harandi AM*. (2016) *Comparative Systems Biology Analysis Reveals Molecular Signature of Three Clinically Tested Vaccine Adjuvants***.** Sci. Rep. 6:39097**.**
41. Tippmann S, Nielsen J, **Khoomrung S*.** (2016) *Improved quantification of farnesene during microbial production from S. cerevisiae in two-liquid-phase fermentations.* Talanta. 146: 100-106.
42. **Khoomrung S*,** Martinez JL, Tippmann, S, Jansa-Ard S, Buffing M, Nicastro R, Nielsen J. (2015) *Expanded metabolite coverage of Saccharomyces cerevisiase extract through improved chloroform/methanol extraction and t-BDMS derivatization.* Anal. Chem Res. 6:9-16.
43. Qin J. G., Zhou Y. J., Krivoruchko A, Huang M, Liu L, **Khoomrung S**, Siewers S, Jiang B, Nielsen J*. (2015) *Modular pathway rewiring of Saccharomyces cerevisiae enables high-level production of L-ornithine*. Nat Commun 6: 8224.
44. Nicastro R, Tripodi F, Guzzi C, Reghellin V, **Khoomrung S**, Airoldi C, Nielsen J, Alberghina L, Coccetti P*. (2015) *Enhanced amino acid utilization sustains growth of cells lacking Snf1/AMPK.* BBA- Mol Cell Res. 1853: 1615-1625.
45. **Khoomrung S*,** Raber G, Laoteng K, Francesconi KA. (2014) *Identification and characterization of fish oil supplements based on fatty acid analysis combined with a hierarchical clustering algorithm.* Eur Lipid Sci Tech**.** 116:795-804.

46. Knuf C, Nookaew I, Remmers I, **Khoomrung S,** Brown S, Berry A, Nielsen J*. (2014) *Physiological Characterization of the High Malic Acid-Producing Aspergillus oryzae Strain 2103a-68.* Appl Microbiol Biotechnol 98(8): 3517-3527.
47. Hussain A, Olausson H, Nilsson S, Nookaew I, **Khoomrung S,** Andersson L, Koskela A, Tuukkanen J, Ohlsson C, Holmag A*. (2013) *Maternal beef and postweaning herring diets increase bone mineral density and strength in mouse offspring.* Exp Biol Med (Maywood)**.** 238:1362-1369.
48. Hussain A, Nookaew I. **Khoomrung S**, Andersson L, Larsson I, Hulthen L, Jansson N. Jakubowicz R, Nilsson S, Sandberg AS, Nielsen J, Holmang A*. (2013) *A maternal diet of fatty fish reduces body fat of offspring compared with a maternal diet of beef and a post-weaning diet of fish improves insulin sensitivity and lipid profile in adult C57BL/6 male mice.* Acta Physiol**.** 209: 220-234.
49. **Khoomrung S**, Chumnanpuen P, Jansa-Ard S, Ståhlman M, Nookaew I, Boren J, Nielsen J*. (2013) *Rapid quantification of yeast lipid using microwave-assisted total lipid extraction and HPLC-CAD*. Anal Chem. 85: 4912-4919.
50. **Khoomrung S**, Chumnanpuen P, Jansa-ard S, Nookaew I, Nielsen J*. (2012) *Fast and accurate preparation fatty acid methyl esters by microwave-assisted derivatization in the yeast Saccharomyces cerevisiae.* Appl Microbiol Biotechnol, 94: 1637-1646.
51. Shi S, Valle-Rodríguez JO, **Khoomrung S**, Siewers V, Nielsen J*. (2012) *Functional expression of five wax ester synthases in Saccharomyces cerevisiae and their utility for biodiesel production***.** Biotechnol Biofuels, 5:7.
52. Raber G*, **Khoomrung S**, Taleshi MS, Edmonds JS, Francesconi KA. (2009) *Identification of arsenolipids with GC/MS*. Talanta. 78: 1215-1218.
53. **Khoomrung S**, Laoteng K, Jitsue S, Cheevadhanarak S*. (2008) *Significance of fatty acid supplementation on profile of cell growth, fatty acid and gene expression of three desaturases in Mucor rouxii.* Appl Microbiol Biotechnol. 80: 499 -506.

Review articles

1. Jariyasopit N, **Khoomrung S***. (2023) *Mass Spectrometry-based Analysis of Gut Microbial Metabolites of Aromatic Amino Acids.* Comput. Struct Biotechnol. 21:4777-4789.
2. Mathema VB, Sen P, Lamichhane S, Orešič M, **Khoomrung S**[*]. (2023) *Deep learning facilitates multi-data type analysis and predictive biomarker discovery in cancer precision medicine.* Comput. Struct Biotechnol. 21:1372-1382.
3. Pomyen Y, Wanichthanarak K, Poungsombat P, Fahrmann J, Grapov D, **Khoomrung S*** (2020) *Deep Metabolome: Applications of deep learning in metabolomics.* Comput. Struct Biotechnol. 18: (2818-2825).
4. Sen P*, Lamichhane S, Mathema VB, McGlinchey A, Dickens AM, **Khoomrung S**, Orešič M. (2021) *Deep learning meets metabolomics: A methodological perspective. Briefings in Bioinformatics.* 00:1-12.
5. Grapov D*, Fahrmann F, Wanichthanarak K, **Khoomrung S**. (2018) *Rise of deep learning for genomic, proteomic and metabolomic data integration in precision medicine.* OMICS. 10: 630-636.
6. **Khoomrung S**[*]**,** Wanichthanarak K, Nookaew I, Thamsermsang O, Seubnooch P, Laohapand T, Akarasereenont P[*]. (2017) *Metabolomics and integrative omics for the development of Thai traditional medicine*. Front. Pharmacol 8: 474.

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Selected invited Lectures/Talks

1. **Metabolomic Approaches for Natural Products Research: From Discovery to Clinical Translation 21th August, 2025.** SingHealth Duke-NUS institute of Biodiversity Medicine (BD-MED), National Cancer Centre of Singapore (NCCS), Singapore.

2. **High-Resolution Molecular Imaging Using DESI-cIM-MS —MS Red Carpet Day 2025 From Ions to Insights — Celebrating the Science Behind Every Peak.** 19th August 2025 Shangri-La Singapore, 22 Orange Grove Rd, Singapore 258350, Singapore.
3. **Integrating Mass Spectrometry, Bioinformatics, and Databases to Advance Precision Medicine—MS Horizons 2025: Innovation, Imaging, Ion Mobility, and Impact.** MS Horizons 2025, 14th August 2025, Thonburi Hall, Siriraj Hospital, Mahidol University, Thailand.
4. **Quantification of Host and Gut Microbial Metabolite Biomarkers in Chronic Kidney Disease.** Advancing Cancer Research: Biomarker Identification through Metabolomics and Cell Analysis, 5th August 2025, Chulabhorn Research Institute, Chulabhorn Convention Center, 2nd Floor, Meeting Room 1, Bangkok, Thailand.
5. **From discovery to Applications: Siriraj and the Growth of Metabolomics in Thailand**, Opening ceremony of SiMPC Services, 16th July 2025, Sirindhorn conference room, Chalermprakiat Building, Faculty of Medicine Siriraj Hospital. (Opening lecture)
6. **Metabolomics data processing, analysis, and Metabolite identification using Metabox 2.0 and SiMD (BioHup session).** The 21st Annual Conference of the Metabolomics Society, June 22-26, Prague, Czech Republic.
7. **Integrating Mass Spectrometry, Databases, and Bioinformatics to Advance Natural Product Research for Human Health**, Annual TRF Senior Research Scholars Group Meeting 2025. April 24, 2025 (9:00 AM – 4:30 PM): Main Auditorium, 2nd Floor, Chulabhorn Graduate Institute, Bangkok, Thailand.
8. **Update on Metabolomics and Metabolomics Activities in Thailand.** MEDHAGKATHON ASIA 2025, 3-7 February 2025, Faculty of Pharmaceutical Sciences, Burapha University.
9. **Enhancing Mass spectrometry and Bioinformatics for Chronic Kidney Disease Metabolite Biomakrers Discovery.** The 18th International Conference on Data and Text Mining in Biomedical Informatics (DTMBIO) December 16-19, 2024. Queen Sirikit National Convention Center, Bangkok, Thailand.
10. **Advances in Natural product research and Its application in human health.** Empowering Connectivity in Chemistry Tai-Thailand Bilateral Symposium, August 11-15, 2024, Kaohsiung, Taiwan (Invited Speaker)
11. **Natural product research and its application to host-microbe interactions.** The 20th National Research & innovation conference, King Narasuan the Great Exhibition & Convention Center, July 11, 2024 (Invited Speaker)
12. **Scratching the Surface of personalized Nutrition in Thailand**. e-ASIA Workshop for the 13th Joint Call Proposal Discovering Synergies: Connecting People Across Asian Research Frontiers Jan 16, 2024 (Online)
13. **Metabolomics and Chronic Kidney Disease**. KMUTT Biotechnology Seminar, Salocha Meeting Room, Pilot Plant Development and Training Institute, KMUTT Bangkhuntien, 13-12-2023.
14. **Advances in Mass-Spectrometry-Based Metabolomics for Kidney Precision Medicine**: The 30th FAOBMB and BMB Conference, Bangkok, 22-25 November 2023. (International Conference).
15. **Insights for the Development of Siriraj Metabolomics and Phenomics Center, and Thailand Metabolomics Society**: Special lecture at Faculty of Medicine, Prince of Songkhla University, 21 November, 2023.
16. **MS-based metabolomics standards in clinical research**: The 23rd Annual Meeting, August 7-11, 2023 Bangkok, Thailand, Genomic Standards for Precision Medicine, Agriculture, Comparative Genomics, and Metabolomics: Presentation title: (International conference)
17. **Advances in MS-based metabolomics for natural product frontiers research**: Thailand-Taiwan Bilateral Symposium July 23-26, 2023 Classic Hotel Kameo & Serviced, Ayutthaya, Thailand. (International conference)
18. **Advances in Mass Spectrometry-Based Metabolomics for Precision Medicine in Kidney Disease**: The 4th Materials Research Society of Thailand International Conference (MRS-Thailand 2023) 28 February – 4 March 2023, Ubon Ratchathani, Thailand (International Conference).

19. **Metabolomics for the Development of human Vaccine**. The 44th on Science and Technology of Thailand; Science and Technology in the Disruptive Era October 29th-31st 2018, Bangkok Internaltional Trade & Exhibition Centre (BITEC), Bangkok, Thailand.
20. **Metabolomics of Alum Adjuvant**: The 2nd CU FPhS-RIKEN CDB Symposium and 34th International Annual Meeting in Pharmaceutical Sciences, with the theme of "*Advances in Cellular and Molecular Biology*, March 8-9, (2018) Bangkok, Thailand.
21. **Metabolomics research in Thailand:** The 1st Asian Oceania Metabolomics Forum (nine countries including Australia, New Zealand, Korea, Indonesia, Japan, Singapore, Malaysia, China and Thailand), September 6, (2017) Bangkok, Thailand.
22. **Metabolomics at SiMPC**: Seminar on Metabolomics and Phenomics Study at Faculty of Medicine Siriraj Hospital, Mahidol University July 7, (2017) Bangkok Thailand.
23. **Metabolomics of Fluad and Stamaril:** The 5th BiovacSafe Annual meeting, 8-10 June, (2017) Reykjavik, Iceland.
24. **Rapid quantification of yeast lipid using microwave-assisted total lipid extraction and HPLC-CAD:** Swedish Mass Spectrometry Society, Annual Symposium, 5-7 (2014) October, Sweden.
25. **Metabolomics: A tool for understanding biological complexity:** Advanced course in Lipid-Protein Interactions: Understanding their Importance and Modulation in Cell Physiology, 18-21 August (2014) Cuernavaca, Morelos**,** Mexico.
26. **Metabolomics: Analytics method driving progress in biological research:** The 1st Regional Undergraduate Conference on Agricultural Sciences and Technology; RUCA I. "Challenging Sustainable and Green Agriculture toward AEC", 3-5 April (2014) Silpakorn University (Petchaburi Campus), Thailand.
27. **Metabolomics: Analytics Method Driving Progress in Cell Factories:** The 1st ASEAN Microbial Biotechnology Conference 2014 (AMBC2014) 19 – 21 February (2014), BIOTEC, Bangkok Thailand.
28. **Analytical platform for characterization and identification of high-value chemicals in microbial cells:** Mini-symposium "Agilent in Metabolomics Nordic Tour" at Chalmers University of Technology, November 14 (2012) Gothenburg, Sweden.
29. **Determination of arsenic containing-fatty acids in cod liver oil by GC/MS:** The 16th Young Investigators' Seminar on Analytical Chemistry, June 26 - July 2 (2009) Graz, Austria
30. **Preliminary attempts to determine arsenic-containing fatty acids by GC/MS:** The 15th Young Investigators' Seminar on Analytical Chemistry, July 2 – 5 (2008) Ljubljana**,** Slovenia

Poster presentation

1. **Khoomrung S**, Nookaew I, Sen P, Olafsdottir TA, Persson J, Moritz T, Andersen PL, Harand AM, Nielsen J. *Metabolomics of Alum Adjuvant*. The 14th Annual Metabolomics 2018 Conference. June 24-28 (2018) Seattle WA, USA.
2. Akarasereenont P, Wattanarangsan J, Wanichthanarak K, Manocheewa S, Limsuvan S, Boonrak R, Vannabhum M, **Khoomrung S**. *Absolute Quantification of Phenolic Compounds in Thai Herbal Medicines by LC-MS/MS*. The 14th Annual Metabolomics 2018 Conference. June 24-28 (2018) Seattle WA, USA.
3. **Khoomrung S**, Sen P, Nookaew I, Moritz T, Nielsen J. *Metabolomics for biomarkers of vaccine immunosafety*. 3rd Advance & Application in Human Disease Conference, May 25-26, (2016) Boston, USA.
4. **Khoomrung S,** Martinez JL, Jansa-Ard S, Nielsen J. *Improved Chemical Derivatization of Tert-butyldimethylsilylation for Quantitative Analysis of Amino/Non-amino Acids by GC-MS in Saccharomyces cerevisiae*. Annual Metabolomics Meeting, 26- 27 March, (2015) Uppsala, Sweden.
5. **Khoomrung S,** Nielsen J. *Rapid quantification of yeast lipid using microwave-assisted extraction total lipid extraction and HPLC-CAD.* The 4th European lipidomics meeting, September 22-24, (2014) Graz, Austria.
6. **Khoomrung S,** Jansa-ard S, Martinez JL, Nookaew I, Moritz T, Nielsen J. *Analytical Plattform for metabolome analysis of microbial cell factory*. The 10th International Conference of the Metabolomics Society, 23-26 June, (2014) Tsuruoka, Japan.

7. **Khoomrung S,** Jansa-ard S, Martinez JL, Nookaew I, Moritz T, Nielsen J. *Analytical platform for metabolome analysis of microbial cell factory.* The 9th International Conference of the Metabolomics Society, 1-4 July, (2013) Glasgow, Scotland.
8. **Khoomrung S,** Chumnanpuen P, Nookaew I, Nielsen J. Microwave-assisted: *Fast and accurate sample preparation technique for hight-hrouput lipidomics*. LIPID MAPS Annual Meeting 2012: Lipidomics impact on cell biology, metabolomics and translational medicine, May 7-8, (2012) La Jolla, CA USA.
9. **Khoomrung S,** Nookaew I, Chumnanpuen P, Nielsen J. *Optimization of mouse lipidomic analysis: a fast and accurate method*. Metabolomeeting. September 25-28, (2011) Helsinki Finland.
10. **Khoomrung S,** Laoteng K, Tanticharoen M, and Cheevadhanarak, S. *Lipid classification of Mucor rouxii under different growth environments.* The 8th Annual Meeting of the Thai Society for Biotechnology, 2-3, November (2006) Bangkok, Thailand

Computer software and Web application development

1. Siriraj Metabolomics Data Wearhouse (SiMD): https://si-simd.com/
2. Metabox 2.0: https://metsysbio.com/tools_protocols/metabox-2-0/
3. Linear mixed-effects modelling for normalization of clinical metabolomics data by using subject metada. http://metsysbio.com/tools.html

Teaching and Mentoring experience

Course lectures

Faculty of Medicine Siriraj hospital, Mahidol University

2017-present:

Graduate:

-Metabolomics approach for precision medicine
-Microbiome and disease related
-Metabolomics and Systems Biology in Stem Cell research
-Introductory to medical metabolomics
-Metabolomics data analysis
-Omics and systems biology in biomedical research
-Big data and Biomedical Sciences
-Metabolomics & its applications
-Mass Spectrometry
-Uni and multi variate analysis
-Critical reading in scientific journal

Undergraduate

-Introduction to medical metabolomics

Faculty of Science, Mahidol University

Graduate:

-Metabolomics & its applications
-Mass spectrometry-based metabolomics

Mentoring activities (Current)

Researcher/postdoc	10
Research assistant	2

PhD student/Co-supervisor	3/1
Master student	3

Prince Mahidol Award Youth Program (อาจารย์ที่ปรึกษาโครงการเยาวชนทุนเจ้าฟ้ามหิดล)

- **นพ. ฐิติพัฒน์ พัฒนาประทีป (2567)**
- **นพ.ปุญญภัทร มาประโพธิ์ (2561)**

Alumni (Faculty of Medicine Siriraj Hospital, Mahidol University)

Postdocs and researchers

1. Dr. Pitchnaree Kraikaew	2023-2025
2. Dr. Niken Indrati	2023-2025
3. Dr. Chakriya Sansupa	2023-2025
4. Dr. Wilailak Kaewsri	2023-2024
5. Dr. Kassaporn Duangkumpha	2020-2024
6. Dr. Fredrick Nwude Eze	2022-2023
7. Dr. Alongkorn Kurilung	2020-2022
8. Dr. Oyenike Olufunmi Olatunji	2022-2022
9. Dr. Sitanan Sartyoungkul	2020-2022
10. Dr. Krittima Anekthanakul	2019-2022
11. Dr. Khwanta Kaewnarin	2019-2021
12. Dr. Apiwat Sangphukieo	Jan- May 2020
13. Dr. Sakchai Hongtong	2018- 2019

Research Assistant

1. Patcha Poungsombut (M.Sc.)	2019-2025
2. Kittiphat Pitchayametathun (B.Sc.)	2020-2022
3. Suphitcha Limjiasahapong (M.Sc.)	2018-2020
4. Chalita Phutthasimma (M.Sc.)	2019-2020
5. Santikorn Chaimanee (M.Sc.)	2019-2020

PhD student

1. Weerawon Manokasemsan	2018-2024

Master Student

1. Bowornpol Nuim	2021-2025
2. Nichapa Kleekomut	2021-2024
3. Thiwat Phochmak	2020-2023
4. Kajol Thapa	2020-2022
5. Esha Dhakal	2018-2022

Internship

1. Nicha Tongdee (Intern Student) **Class of 2026:** Choate Rosemary Hall, **USA**	2025
2. Louis Lim Li Jie, PhD Student, NTU, **Singapore**	2024
3. Nicha Tongdee (class of 2026 Choate Rosemary Hall) **USA**	2024

4. Lew Yen Jun Renee (PhD student) NUS, **Singapore** 2024
5. Na Minyoung (Phd Student) NTU, **Singapore** 2024
6. Rungwalee Saibuakham, (B.Sc.) KMUTT, **Thailand** 2023
7. Dylan Koh Hong Zheng (Phd student), NTU, **Singapore** 2023
8. Praj Chirathivat (Choate Rosemary Hall, Wallingford, CT), **USA** 2021
9. Ruthairatch Poonsornsiri (Deerfield Academy, Massachusetts), **USA** 2020
10. Prattakorn Metem (Chulalongkorn University), **Thailand** 2019
11. Punvinai Vinaisuratern (Chulalongkorn University), **Thailand** 2019
12. Wichaya Asawalertpanich (Chulalongkorn University), **Thailand** 2019

Chalmer University of Technology, Sweden
Master student

1. Marieke F Buffing 2011-2011

PhD Thesis Examiner

1. **Dr. Grace Filbertine:** *The Role of Metabolism and Gene Expression in Juvenile and Adult SLE* University of Liverpool and Chulalongkorn University. **Date:** July 2, 2025
2. **Dr. Nureesun Mahamud:** *Neuroprotective Effects and Metabolomic Studies of Oxyresveratrol in Rotenone-Induced Neuroblastoma SH-SY5Y Cytotoxicity for a Preventive Approach to Parkinson's Disease* Chulalongkorn University **Date:** June 9, 2023
3. **Dr. Thanikarn Suk-aram:** *Analysis of VOCs from Exhaled Breath for the Diagnosis of Hepatocellular Carcinoma.* Chulalongkorn University. **Date:** June 9, 2023
4. **Dr. Niken Indrati**: *Ma-Muang Bao Chae-Im, an Osmotic Dehydrated Mango: Metabolomics Analysis and its Related Microbial Diversity during Production and Storage* Prince of Songkla University. **Date:** April 28, 2022
5. **Dr. Kassporn Duangkumpha**: *A Peptidomic Approach for Discovery of Cholangiocarcinoma Risk Biomarkers in Serum and Urine of Subjects with Periductal Fibrosis in an Opisthorchiasis Endemic Area of Thailand*. Khon Kaen University. **Date:** December 12, 2018