

Abstracts of papers presented  
at the 2024 Cold Spring Harbor Asia Conference

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# CHEMICAL BIOLOGY & DRUG DISCOVERY

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May 27–May 31, 2024

Arranged by

Young-Tae Chang, *Pohang University of Science and Technology*  
Haian Fu, *Emory University School of Medicine*  
Giulio Superti-Furga, *Austrian Academy of Sciences*  
Liyun Zhang, *Nankai University*



Cold Spring Harbor Conferences Asia  
Cold Spring Harbor Laboratory



## CHEMICAL BIOLOGY & DRUG DISCOVERY

Monday, May 27 – Friday, May 31, 2024

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Monday	7:00 pm	<b>1</b> Transporters for Chemical Biology
Tuesday	9:00 am	<b>2</b> Chemical Probe
Tuesday	2:00 pm	<b>Poster Session</b>
Tuesday	3:00 pm	<i>Chinese Tea and Beer Tasting</i>
Tuesday	7:00 pm	<b>3</b> Chemoproteomics
Wednesday	9:00 am	<b>4</b> Bioimaging
Wednesday	2:00 pm	<i>Visit to Old Suzhou*</i>
Wednesday	7:00 pm	<b>5</b> Chemical Biology I
Thursday	9:00 am	<b>6</b> Chemical Biology II
Thursday	2:00 pm	<b>7</b> Drug Discovery I
Thursday	6:00 pm	Cocktails and Banquet
Friday	9:00 am	<b>8</b> Drug Discovery II

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Oral presentation sessions are located in the CSHA Auditorium  
Poster session and Chinese Tea & Beer Tasting are in the Lake Front Hall.

Cocktail social hour is held outside in the Suz Garden.

Old Suzhou visits depart from the CSHA lobby

*\*optional tour requires additional fee.*

Meal locations and times are as follows:

Lunch: Main Cafeteria 12:00pm - 1:30pm

Dinner: Main Cafeteria 6:00pm - 7:30pm

Banquet: Suz Garden 7:00pm

More information will be available at CSHA office.  
*(Map at the end of this abstract book)*

## PROGRAM

MONDAY, May 27—7:00 PM

### **SESSION 1** TRANSPORTERS FOR CHEMICAL BIOLOGY

**Chairperson:** **Young-Tae Chang**, Pohang University of Science and Technology (POSTECH), Pohang, Korea

#### **KEYNOTE SPEAKER**

##### **Understanding and modulating disease by targeting SLC transporters**

Giulio Superti-Furga, Vojtech Dvorak, Patrick Essletzbichler, Andras Boeszoermenyi, Leonhard X. Heinz, Manuele Rebsamen, Ariel Bensimon, Enrico Girardi, Yee-Kwan Law, Evandro Ferrada, Fabian Frommelt, Ulrich Goldmann, Maojun Yang, Tabea Wiedmer [35'+10']  
Presenter affiliation: CeMM Research Center for Molecular Medicine of the Austrian Academy of Sciences, Vienna, Austria; Medical University of Vienna, Vienna, Austria.

1

##### **Live cell distinction using fluorescent probes**

Young-Tae Chang [20'+5']  
Presenter affiliation: POSTECH, Pohang, South Korea.

2

##### **Antibody-guided targeted protein degradation**

Jiang Xia, Dingdong Yuan, Yishu Bao, Zhiyi Xu [10'+5']  
Presenter affiliation: The Chinese University of Hong Kong, Hong Kong, China.

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TUESDAY, May 28—9:00 AM

**SESSION 2** CHEMICAL PROBE

**Chairpersons:** **Seung Bum Park**, Seoul National University, Seoul, Korea  
**Peng Chen**, Peking University, Beijing, China

**Bioorthogonal chemistry-enabled spatial-temporal proteomics**

Peng R. Chen [20'+5']

Presenter affiliation: Peking University, Beijing, China.

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**Targeted protein upregulation potentiates STING agonist immunotherapy**

Seung Bum Park [20'+5']

Presenter affiliation: Seoul National University, Seoul, South Korea; SPARK Biopharma, Seoul, South Korea.

5

**Metabolic reprogramming based islet regeneration**

Jin Li [10'+5']

Presenter affiliation: Fudan University, Shanghai, China.

6

**Development of abiotic metal catalytic subsystems working in eukaryotic cells**

Yugang Bai, Tong Wu, Yating Fei, Yingjiao Deng [10'+5']

Presenter affiliation: Hunan University, Changsha, Hunan, China.

7

**Break**

**Deciphering the glycode by chemical biology approaches**

Xing Chen [20'+5']

Presenter affiliation: Peking University, Beijing, China.

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**N-Acryloylindole-alkynes (NAIAs) as chemoproteomic probes to identify new ligandable cysteines and discover therapeutic covalent ligands**

Clive Yik-Sham Chung [10'+5']

Presenter affiliation: The University of Hong Kong, Hong Kong, China.

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**Unusual MurC discovered in Lachnospiraceae via developing a selective labeling probe for gut microbiota**

Wei Wang [10'+5']

Presenter affiliation: Fudan University, Shanghai, China.

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**POSTER SESSION**

- A systematic analysis of label-free chemical proteomics approaches for large-scale target deconvolution**  
Yuanming Bi, Ya Zeng, Soon Heng Chris Tan  
Presenter affiliation: Southern University of Science and Technology, Shenzhen, China. 11
- Reprogramming protein translation in spatiotemporal stress response**  
Dalu Chang, Chayasith Uttamapinant, Yimon Aye  
Presenter affiliation: EPFL, Lausanne, Switzerland. 12
- NDR1-MYC interaction peptide disruptor MN3-TAT suppresses MYC-dependent colorectal cancer**  
Jiani Lu, Pengcheng Qin, Hongtao Li, Yexi Li, Danmei Yu, Ye Wu, Xin Luan, Hongzhuan Chen, Haiyan Fu, Lili Chen  
Presenter affiliation: Shanghai University of Traditional Chinese Medicine, Shanghai, China. 13
- Probing the molecular mechanism of action of kenpaullone in lymphangiogenesis**  
Caroline A. Cuoco, Christophe Ravaud, Paul R. Riley, Angela J. Russell  
Presenter affiliation: University of Oxford, Oxford, United Kingdom. 14
- Peptide ligand screening using the bacterial type 1 secretion system in microdroplets**  
Tobias V. Eden, Julius Fredens  
Presenter affiliation: National University of Singapore, Singapore. 15
- Automated high-throughput activity-based protein profiling facilitates covalent drug discovery**  
Yumeng Li, Zhenze Jiang  
Presenter affiliation: China Innovation Center of Roche, Shanghai, China. 16
- Gel-based prefractionation for functional characterization of proteoforms and their drug interaction by thermal proteome and co-aggregation analysis**  
Fengming Li, Ya Zeng, Yue Li, Chris Soon Heng Tan  
Presenter affiliation: Southern University of Science and Technology, Shenzhen, China. 17

- Heterobifunctional molecular system for regulation of cellular signaling transduction and subcellular organelle homeostasis**  
Songhan Liu, Bengang Xing  
 Presenter affiliation: Nanyang Technological University, Singapore. 18
- Chemical biology approaches to target the “undrugged” SMAD4 protein**  
 Pooja Kumari, Xiulei Mo  
 Presenter affiliation: Emory University, Atlanta, Georgia. 19
- Peptide functionalization improves the therapeutic index of glucocorticoid drugs for treating inflammatory diseases**  
 Xian Wu, Hong Guo, Hui Gao, Hongbo Pang  
 Presenter affiliation: University of Minnesota, Minneapolis, Minnesota. 20
- Hypoxic exosomal circPLEKHM1-mediated crosstalk between tumor cells and macrophages drives lung cancer metastasis**  
Shuang Tang, Dongliang Wang, Shuoer Wang, Shaoli Song  
 Presenter affiliation: Fudan University Shanghai Cancer Center, Shanghai, China. 21
- Dissecting the mechanism of action for metformin with thermal proteome and co-aggregation analysis**  
Ya Zeng, Yuanming Bi, Zhenxiang Zheng, Soon Heng Tan  
 Presenter affiliation: Southern University of Science and Technology, Shenzhen, China; Hong Kong Baptist University, Hong Kong, China. 22
- Mapping protein complexes perturbed by chemical modulators of autophagy and mitophagy with thermal proximity co-aggregation**  
Shuang Zhang, Fengming Li, Bin Liao, Jun Wang, Ya Zeng, Soon Heng Tan  
 Presenter affiliation: Southern University of Science and Technology, Shenzhen, Shenzhen, China. 23
- Charting interactome dynamics during ovarian aging in mice and by anti-aging chemicals with thermal proteome and proximity**  
Miao Zhao, Soon Heng Tan  
 Presenter affiliation: Southern University of Science and Technology, Shenzhen, China. 24

TUESDAY, May 28—3:00 PM

**Chinese Tea and Beer Tasting**

**SESSION 3** CHEMOPROTEOMICS

**Chairpersons:** **Peng Zhou**, Peking University, Beijing, China  
**Alessio Ciulli**, University of Dundee, Dundee,  
United Kingdom

**How PROTAC degraders work—Molecular recognition and design principles**

Alessio Ciulli [20'+5']

Presenter affiliation: University of Dundee, Dundee, United Kingdom. 25

**Mapping drug-protein and protein-protein interactions at scale with protein cellular biophysics and mass spectrometry**

Chris Soon Heng Tan [10'+5']

Presenter affiliation: Southern University of Science & Technology, Shenzhen, China; Shenzhen Bay Laboratory, Shenzhen, China. 26

**Increasing throughput of label-free chemical proteomics approaches with matrix-augmented pooling strategy and data-independent acquisition**

Qiqi Wang, Hongchao Ji, Soon Heng Tan [10'+5']

Presenter affiliation: Southern University of Science and Technology, Shenzhen, China. 27

**Break**

**Spatially resolved mapping of subcellular biomolecules via photocatalytic and immuno-proximity labeling**

Peng Zou [20'+5']

Presenter affiliation: Peking University, Beijing, China. 28

**Chemoproteomic interrogation of protein glutamine serotonylation**

Rongsheng Zeng, Yuanhong Cai, Zheng Liu, Haitao Li, Xiang David Li,  
Xin Li [10'+5']

Presenter affiliation: Shenzhen Bay Laboratory, Shenzhen, China. 29

**The use of bioorthogonal metabolic labeling in aerospace biomedical research—Microgravity effects on the brain and gut bacteria**

Xin Zhang, Zhujun Wu, Yulin Deng, Zhimin Wang [10'+5']

Presenter affiliation: Beijing Institute of Technology, Beijing, China. 30

## SPONSOR TALK

### **Building a proteome-wide resource for protein sciences**

Tao Chen [20'+5']

Presenter affiliation: Absea Biotechnology Ltd., Berlin, Germany.

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WEDNESDAY, May 29—9:00 AM

### **SESSION 4**      BIOIMAGING

**Chairpersons:** **Bengang Xing**, Nanyang Technological University, Singapore  
**Dirk Trauner**, University of Pennsylvania, Philadelphia, Pennsylvania, USA

### **Ion channels as an inspiration for synthetic chemists**

Dirk Trauner [20'+5']

Presenter affiliation: University of Pennsylvania, Philadelphia, Pennsylvania.

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### **<sup>68</sup>Ga-FAPI PET imaging monitors response to combined TGF- $\beta$ R inhibition and immunotherapy in metastatic colorectal cancer**

Shuang Tang, Ke Li, Wei Liu, Shaoli Song [10'+5']

Presenter affiliation: Fudan University Shanghai Cancer Center, Shanghai, China.

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### **Fluorogenic and cell-permeable rhodamines for live-cell protein labeling in superresolution imaging and biosensing**

Lu Wang [10'+5']

Presenter affiliation: Fudan University, Shanghai, China.

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### ***Break***

### **Bioorthogonal click conjugation for NIR fluorescent imaging and ENCTACs epigenetic therapeutic deactivation**

Bengang M. Xing, Songhan M. LIU [20'+5']

Presenter affiliation: Nanyang Technological University, Singapore.

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**Fixable fluorescence quenched substrates that enable simultaneous cell-based imaging of lysosomal enzyme activities and protein markers**

Sha Zhu, Matthew C. Deen, Yanping Zhu, Pierre-André Gilormini, Xi Chen, Oliver B. Davis, Marcus Y. Chin, Anastasia G. Henry, David J. Vocadlo [10'+5']

Presenter affiliation: Simon Fraser University, Burnaby, Canada. 36

**Medicinal chemical biology study of photo-catalytic redox reaction in cancer cells**

Huaiyi Huang [10'+5']

Presenter affiliation: Sun Yat-sen University, GuangZhou, China. 37

**Decoding and targeting transcriptional dysregulation in triple-negative breast cancer with chemical probes**

Qin Wu [10'+5']

Presenter affiliation: Hangzhou Institute of Medicine (HIM), Chinese Academy of Sciences, Hangzhou, China. 38

**Human pluripotent stem cells, organoids and drug screening**

Shuibing Chen [20'+5']

Presenter affiliation: Weill Cornell Medicine, New York, New York. 39

WEDNESDAY, May 29—2:00 PM

**Visit to Old Suzhou**

WEDNESDAY, May 29—7:00 PM

**SESSION 5** CHEMICAL BIOLOGY I

**Chairpersons:** **Motonari Uesugi**, Kyoto University, Kyoto, Japan  
**Quan Chen**, Nankai University, Tianjin, China

**Small molecule agonist of mitofusin 1 repairs mitochondrial dysfunction**

Quan Chen [20'+5']

Presenter affiliation: Nankai University, Tianjin, China. 40

**Some new insights into aging and reverse aging with comparative views of animal and plant aging**

Hong Gil Nam [20'+5']

Presenter affiliation: The Ever Summer Labs for Aging Research, Deagu, South Korea; Reverse Aging Labs, Seoul, South Korea. 41

**Chemical biology of self-assembly**

Motonari Uesugi [20'+5']

Presenter affiliation: Kyoto University, Kyoto, Japan. 42

THURSDAY, May 30—9:00 AM

**SESSION 6**      CHEMICAL BIOLOGY II

**Chairpersons:** **Sek Tong Derric Ong**, National University of Singapore, Singapore  
**Yan Zhang**, Nanjing University, Nanjing, China

**Photo-controllable bioorthogonal reactions and biomolecules**

Jinbo Li, Ziwei Xi, Yan Zhang [20'+5']

Presenter affiliation: Nanjing University, Nanjing, China. 43

**Targeted protein O-GlcNAcylation using bifunctional small molecules**

Bowen Ma, Khadija Shahed Khan, Tongyang Xu, Josefina Xequé Amada, Zhihao Guo, Yunpeng Huang, Yu Yan, Henry Lam, Alfred Sze-Lok Cheng, Billy Wai-Lung Ng [10'+5']

Presenter affiliation: The Chinese University of Hong Kong, Hong Kong, China. 44

**Harnessing the power of small molecules to develop better CRISPR systems and vice versa**

Ju Zhang, Li Chen, Shixian Wei, Yu Wang [10'+5']

Presenter affiliation: Shenzhen University, Shenzhen, China. 45

**Break**

**Synthesis of solar fuel by photoelectrocatalysis of enzymes**

Haishuo Ji, Wenjin Li, Yanxin Gao, Liyun Zhang [20'+5']

Presenter affiliation: Nankai University, Tianjin, China. 46

**Applying chemical biology approaches to expand our molecular understanding of glioblastoma pathogenesis**

Derrick Ong [20'+5']

Presenter affiliation: National University of Singapore, Singapore.

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**Developing photosynthetic cell factories for value-added products**

Yixi Su, Jiwei Chen, Jingyan Hu, Cheng Qian, Jiahao Ma, Sigurður Brynjólfsson, Weiqi Fu [10'+5']

Presenter affiliation: Zhejiang University, Zhoushan, China; University of Iceland, Reykjavík, Iceland.

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**Multidisciplinary studies of glycans—A case report**

Ran Xie [10'+5']

Presenter affiliation: Nanjing University, Jiangsu, China.

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THURSDAY, May 30—2:00 PM

**SESSION 7 DRUG DISCOVERY I**

**Chairpersons:** **Zijian Guo**, Nanjing University, Nanjing, China  
**Lixin Zhang**, East China University of Science and Technology, Shanghai, China

**From symphony to intelligent manufacturing™ of Porphyrins**

Lixin Zhang [20'+5']

Presenter affiliation: East China University of Science and Technology, Shanghai, China.

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**From inorganic chemical biology to drug development against emerging infectious diseases**

Hongzhe Sun, Hongyan Li, Xueying Wei, Jingxin Chen, Chengyuan Wang, Shuofeng Yuan [20'+5']

Presenter affiliation: The University of Hong Kong, Hong Kong, China.

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**Oxygen species-responsive tetrazine therapy**

Luping Liu, Dongqing Ming, Dongxue Peng [10'+5']

Presenter affiliation: Institute of Materia Medica, CAMS & PUMC, Beijing, China.

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**Chemical biology of resistance-resistant antimicrobials**

Xinxin Feng, Silei Bai, E Lei, Yu Zhou, Anming Yang, Junfeng Song  
[10'+5']

Presenter affiliation: Hunan University, Changsha, Hunan, China. 53

**Break**

**Exploring the immuno-regulatory roles of platinum-based anticancer drugs**

Zijian Guo [20'+5']

Presenter affiliation: Nanjing University, Nanjing, China. 54

**Photosensitizer-amplified antimicrobial materials for broad-spectrum ablation of resistant pathogens in ocular infections**

Charles Lochenie, Sheelagh Duncan, Yanzi Zhou, Leonie Fingerhut, Alex Kiang, Sam Benson, Xiaogang Liu, Bethany Mills, Marc Vendrell  
[10'+5']

Presenter affiliation: University of Edinburgh, Edinburgh, United Kingdom. 55

**Harnessing biosynthesis for revolutionizing natural product research**

Xiaoyu Tang [10'+5']

Presenter affiliation: Shenzhen Bay Laboratory, Shenzhen, China. 56

**Development and potential of cholesterol-free, three-component G-LNPs for spleen-targeted mRNA delivery**

Mao Li, He Zhang, Dejing Liu [10'+5']

Presenter affiliation: Shenzhen Bay Laboratory, Shen Zhen, China. 57

**TXNRD1 drives innate immune response in senescent cells with implications in age-associated inflammation**

Rugang Zhang [10'+5']

Presenter affiliation: The University of Texas MD Anderson Cancer Center, Houston, Texas. 58

THURSDAY, May 30—6:00 PM

**COCKTAILS and BANQUET**

**SESSION 8** DRUG DISCOVERY II

**Chairperson:** **Giulio Superti-Furga**, Austrian Academy of Sciences, Vienna, Austria  
**Haian Fu**, Emory University School of Medicine, Atlanta, Georgia, USA

**Small molecule glues to restore disease mutation-perturbed protein-protein interactions in cancer**

Haian Fu [20'+5']

Presenter affiliation: Emory University School of Medicine, Atlanta, Georgia.

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**A carrier-free self-assembling nanodevice for promoting skin regeneration**

Gus R. Rosania [20'+5']

Presenter affiliation: University of Michigan, Ann Arbor, Michigan.

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**Unveiling structural and mechanical characteristics of site-specific PTM  $\alpha$ -synuclein fibrils in Parkinson's disease**

Yan-Mei Li [20'+5']

Presenter affiliation: Tsinghua University, Beijing, China.

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**Enhanced selectivity in prostate cancer therapy via BET inhibition with self-immolating targeted epigenetic inhibitor**

Cong Tang, Rui Traquete, Elizabeth Henderson, João Conde, Sara Picaud, Panagis Filippakopoulos, Gonçalo Bernardes [10'+5']

Presenter affiliation: Instituto de Medicina Molecular João Lobo Antunes, Lisbon, Portugal.

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**A phosphoglycerate mutase 1 allosteric inhibitor restrains TAM-mediated colon cancer progression**

Miaomiao Gong, Minghao Zhang, Ying Shen [10'+5']

Presenter affiliation: Shanghai Jiao Tong University School of Medicine, Shanghai, China.

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**KEYNOTE SPEAKER**

**Development of small-molecule inhibitors and degraders to target protein-protein interactions**

Shaomeng Wang [35'+10']

Presenter affiliation: University of Michigan, Ann Arbor, Michigan.

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