

Abstracts of papers presented
at the 2025 Cold Spring Harbor Asia Conference

THE REPETITIVE AND MOBILE GENOME

April 7–April 11, 2025

Arranged by

Gael Cristofari, *Institute for Research on Cancer and Aging*
Xiaohua Shen, *Tsinghua University*
Mikiko Siomi, *The University of Tokyo*
Zhao Zhang, *Duke University*



Cold Spring Harbor Conferences Asia
Cold Spring Harbor Laboratory



THE REPETITIVE AND MOBILE GENOME

Monday, April 7 – Friday, April 11, 2025

Monday	7:00 pm	1 Keynote Session
Tuesday	9:00 am	2 Silencing and Epigenetic Control
Tuesday	2:00 pm	Poster Session
Tuesday	3:00 pm	<i>Chinese Tea and Beer Tasting</i>
Tuesday	7:00 pm	3 Domestication and Adaptation
Wednesday	9:00 am	4 Molecular Regulation and Impacts
Wednesday	1:30 pm	<i>Visit to Old Suzhou*</i>
Wednesday	7:00 pm	5 Molecular Mechanism and Consequence
Thursday	9:00 am	6 Aging, Cancer, Disease, and Therapeutics
Thursday	2:00 pm	7 Physiological Consequences
Thursday	5:00 pm	<i>Cocktails and Banquet</i>
Friday	9:00 am	8 Evolution, Development, and Innovation

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 6:00pm

More information will be available at CSHA office.

(Map at the end of this abstract book)

PROGRAM

MONDAY, April 7—7:00 PM

SESSION 1 KEYNOTE SESSION

Chairperson: **Gael Cristofari**, Institute for Research on Cancer and Aging, Nice, France

A retrotransposon in cancer—The marker and the mutator

Kathleen H. Burns [35'+10']

Presenter affiliation: Dana-Farber Cancer Institute, Boston, Massachusetts; Harvard Medical School, Boston, Massachusetts.

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Transposable elements—From parasites to symbionts

Cedric Feschotte [35'+10']

Presenter affiliation: Cornell University, Ithaca, New York.

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TUESDAY, April 8—9:00 AM

SESSION 2 SILENCING AND EPIGENETIC CONTROL

Chairperson: **Sungjin Moon**, Kangwon National University, Chuncheon, Korea

Transposable element silencing in *Drosophila*—Insights from germline and somatic pathways

Abdou Akkouche, Azad Alizada, Aline Martin, Emma Kneuss, Susanne Bornelöv, Nolwenn Mouni e, St ephanie Maupetit-Mehouas, Benjamin Czech Nicholson, Gregory J. Hannon, Emilie Brasset [20'+10']

Presenter affiliation: Universit e Clermont Auvergne, Clermont-Ferrand, France.

3

Bivalent control of composite transposons regulates cell fate transitions

Nian Liu [20'+10']

Presenter affiliation: Tsinghua University-Peking University Joint Center for Life Sciences, Beijing, China.

4

Structural basis of thymidine-rich DNA recognition by *Drosophila* P75 PWWP domain

Ying Huang [10'+5']

Presenter affiliation: Shanghai Jiao Tong University, Shanghai, China. 5

Provirus proximal proteomics identifies PRC1.6 as localized on chromatin with the human silencing hub (HUSH) complex

Tomas C. Rodriguez, Leonid Yurkovetskiy, Karthika Nagalekshmi, ChinHungOscar Lam, Eva Jazbec, Stacy A. Maitland, Scot A. Wolfe, Erik J. Sontheimer, Jeremy Luban [10'+5']

Presenter affiliation: University of Massachusetts Chan Medical School, Worcester, Massachusetts. 6

Break

Hemimethyl DNA recognition protein CDCA7 and DNA methylation-coupled genome homeostasis

Yoichi Shinkai [20'+10']

Presenter affiliation: RIKEN, Wako, Japan. 7

DNA methylation of human polymorphic transposable elements

Ting Wang [20'+10']

Presenter affiliation: Washington University School of Medicine, St. Louis, Missouri. 8

Pcf11/Spt5 condensates stall RNA polymerase II to facilitate termination and piRNA-guided heterochromatin formation

Yang Yu [10'+5']

Presenter affiliation: Guangzhou Medical Center, Guangzhou, China. 9

Evolutionarily conserved function of Cramp1 in suppressing transpositions during somatic development

Yini Luo, Lu Wang [10'+5']

Presenter affiliation: Chinese Academy of Sciences, Shanghai, China. 10

TUESDAY, April 8—2:00 PM

POSTER SESSION

TDRD1 and TDRD12 synergistically silence transposon LINE1 through piRNA-guided slicing during mouse spermatogenesis

Canmei Chen, Deqiang Ding

Presenter affiliation: Tongji University, Shanghai, China. 11

- Leveraging convolutional neural networks (CNNs) for detection of somatic non-reference transposable element insertions**
Yufei Zhang, Yanyan Guo
 Presenter affiliation: Institute of Zoology, Chinese Academy of Science, Beijing, China. 12
- Characterization the L1 Transcription with Nanopore RNA-seq**
Xiaowen Hao, Jingzhao Xu, Linqing Xing, Yibing Tao, Xiaohua Shen
 Presenter affiliation: Tsinghua Univeristy, Beijing, China. 13
- Investigating the landscape of somatic LINE-1 retrotranspositions in human normal cells using PacBio long-read sequencing**
Beomki Lee, Chang Hyun Nam, Hyein Won, Yunah Lee, Young Seok Ju
 Presenter affiliation: Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea. 14
- Comprehensive characterization of chromatin-components and associated repetitive RNAs in aging onset and progression**
Peng Liu, Federico Cutrupi, Yuancheng Ye, Shiqi Jin, Santiago Radio, Alfonso Saera, Gian Marco Messa, Alessia Rappa, Reem Daouk, Dalila Bensaddek, Huoming Zhang, Marco Di Marsico, Matteo Schiavinato, Valerio Orlando
 Presenter affiliation: King Abdullah University of Science and Technology, Thuwal, Saudi Arabia. 15
- The evolution and mechanisms of genome gigantism in Caelifera insects**
Xuanzeng Liu, Yuan Huang
 Presenter affiliation: Shaanxi Normal University, Xi'an, China. 16
- Contrasting effects of histone H2A variants on the establishment of transposon-specific silent modification in Arabidopsis**
Shoko Oda, Sayaka Tominaga, Shumpei Takeuchi, Tetsuji Kakutani, Taiko K. To
 Presenter affiliation: The University of Tokyo, Tokyo, Japan; Institute of Science Tokyo, Tokyo, Japan. 17
- A tale of two tails—Role of the terminal domains in THAP9**
Aditi Saha, Aryaman Ghosh, Sharmistha Majumdar
 Presenter affiliation: Indian Institute of Technology Gandhinagar, Gandhinagar, India. 18

<p>Transposable element bursts in evolutionary history are involved in the differentiation within common ancestors <u>Feng Shao</u>, Minzhi Zheng, Minjin Han, Soojin V. Yi, Zuogang Peng Presenter affiliation: Southwest University School of Life Sciences, Chongqing, China.</p>	19
<p>Age-related DNA methylation alterations as causal mechanism for a TE-mediated neurodegenerative disorder <u>Yogita Sharma</u>, Vivien Horváth, Anita Adami, Raquel Garza, Vilma Andersson, Johan Jakobsson Presenter affiliation: Lund University, Lund, Sweden.</p>	20
<p>Structural insights into DEK–nucleosome interaction reveal its role in maintaining stem cell identity through H3K27me3 modulation <u>Yunfan Shen</u>, Hongda Huang, Kai Yuan Presenter affiliation: Central South University, Changsha, China.</p>	21
<p>The comparison of retrotransposition mechanisms between RLE-type and APE-type non-LTR retrotransposons <u>Shun-Qing Tan</u>, Pujuan Deng, Jia Wang, Jun-Jie Gogo Liu Presenter affiliation: Tsinghua University, Beijing, China.</p>	22
<p>A telomere-to-telomere genome assembly of cotton provides insights into centromere evolution and short-season adaptation Xiongfeng Ma, Guanqing Hu, Zhenyu Wang, <u>Zunzhe Tian</u>, Gaoxiang Ji, Xingxing Wang, Xianliang Zhang, Zhaoen Yang Presenter affiliation: Chinese Academy of Agricultural Sciences, Anyang, China; Chinese Academy of Agricultural Sciences, Shenzhen, China.</p>	23
<p><i>nomad</i> is an active transposon in the male germline of <i>Drosophila</i> <u>Lauren A. Tracy</u>, Zhao Zhang Presenter affiliation: Duke University, Durham, North Carolina.</p>	24
<p>Unraveling the mechanisms of chromosome translocation using HTGTS <u>Jinglong Wang</u>, Richard L. Frock Presenter affiliation: Soochow University, Suzhou, China.</p>	25

- MOV10L1 S818I mutant mouse, a model of male infertility, shows unique phenotypes distinct from MOV10L1-deficient mouse**
Yanling Wei, Shigeki Hirakata, Ryuki Shimada, Yuica Koga, Soichiro Yamanaka, Naoki Takeda, Kimi Araki, Kei-ichiro Ishiguro, Mikiko C. Siomi
 Presenter affiliation: The University of Tokyo, Tokyo, Japan. 26
- Stage-specific transcriptional activation of retrotransposons acts as cis-regulatory elements in programmed development of apical progenitors**
Yuyan Zeng, Da Mi
 Presenter affiliation: Tsinghua University, Beijing, China. 27
- From retroelements to retroviruses—The evolutionary plasticity of reverse-transcribing RNA viruses**
Haoming Zhai, Monique Merchant, Carlos P. Mata, Yangci Liu, Anna V. Protasio, Yorgo Modis
 Presenter affiliation: MRC Laboratory of Molecular Biology, Cambridge, United Kingdom. 28
- Characterizing transposable element expression dynamics and heterogeneity in liver cancer at single-cell level**
Xiaoyu Zhan, Zhewen Xiong, Haoran Wu, Jianquan Cao, Lam Stephen Chan, Sez Lok Alfred Cheng
 Presenter affiliation: The Chinese University of Hong Kong, Hong Kong SAR, China. 29
- Adaptive diversification—Molecular strategies of TIR transposon persistence in plant genomes**
 Ziyue Huang, Bicong Shi, Li Huang, Xinyan Zhang
 Presenter affiliation: Chinese Academy of Agricultural Sciences, Shenzhen, China. 30
- Comparative analysis of the evolution of transposons in two medaka species**
Xiaochi Zhou, Rongfeng Cui
 Presenter affiliation: Sun Yat-Sen University, Shenzhen, China. 31
- LINE-1 transcription activates long-range gene expression**
Ziqiang Zhou
 Presenter affiliation: Tsinghua University, Beijing, China. 32

TUESDAY, April 8—3:00 PM

Chinese Tea and Beer Tasting

SESSION 3 DOMESTICATION AND ADAPTATION

Chairperson: **Jie Cui**, Fudan University, Shanghai, China

An intimate connection between nucleosome assembly and silencing of transposable elements

Zhiqiao Zhang [20'+10']

Presenter affiliation: Columbia University Irving Medical Center, New York, New York.

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The impacts of the dynamic natures of the flamenco piRNA cluster on ovarian somatic cells

Mikiko C. Siomi [20'+10']

Presenter affiliation: The University of Tokyo, Tokyo, Japan.

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Unraveling cryptic endogenous retrovirus subfamilies in the primate lineage using massively parallel reporter assays

Xun Chen, Zicong Zhang, Yizhi Yan, Clement Goubert, Guillaume Bourque, Fumitata Inoue [10'+5']

Presenter affiliation: Kyoto University, Kyoto, Japan; Chinese Academy of Sciences, Shanghai, China.

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Transposable elements and the evolution of the human brain

Johan Jakobsson [20'+10']

Presenter affiliation: Lund University, Lund, Sweden.

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Transcriptional silencing of transposons by SPIN1 in multiple contexts

Yuka W. Iwasaki [10'+5']

Presenter affiliation: RIKEN IMS, Yokohama, Japan.

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The horizontal escape of retrotransposon into poxvirus genome revealed one hidden human mutagen

Pu Gao, Astrid Engel, Cedric Feschotte, Ellen Pritham, Cheng Sun [10'+5']

Presenter affiliation: Capital Normal University, Beijing, China.

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SESSION 4 MOLECULAR REGULATION AND IMPACTS

Chairperson: **Zhengyu Liang**, Southern University of Science and Technology, Shenzhen, China

Taming the repetitive transcriptome with RNA binding proteins

Tugce Aktas [20'+10']

Presenter affiliation: Max Planck Institute for Molecular Genetics, Berlin, Germany.

39

PCNA unloading restricts transposable element activation and maintains chromatin organization during early embryonic development

Shinseog Kim, Seonyeong Lee, Su Hyung Park, Daekee Lee, Kyoo-young Lee, Kyungjae Myung [10'+5']

Presenter affiliation: IBS, Ulsan, South Korea.

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Cryo-EM structures of IStron transposable element reveal molecular mechanism of antagonistic conflict with TnpB associated guide RNA

Jinbiao Ma [10'+5']

Presenter affiliation: Fudan University, Shanghai, China.

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Break

Transposable elements drive duplication and enable transgenesis

Shengjun Tan, Hangxing Jia, Huijing Ma, Yingao Cai, Tongtong Zhang, Haoyi Wang, Yong Zhang [20'+10']

Presenter affiliation: Institute of Zoology, Chinese Academy of Sciences, Beijing, China; University of Chinese Academy of Sciences, Beijing, China.

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Is MERVL involved in the totipotent state?

Haruhiko Siomi, Hirotsugu Ishizu, Akihiko Sakashita [20'+10']

Presenter affiliation: Keio University School of Medicine, Tokyo, Japan.

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Endogenous retroviruses synthesize heterologous chimeric RNAs to reinforce human early embryo development

Yangquan Xiang, Yuli Qian, Zhenyi Zhengyi, Wanlu Liu, Shaorong Gao, Dan Zhang, Hongqing Liang [10'+5']

Presenter affiliation: Zhejiang University, Hangzhou, China.

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Co-evolution of transposable elements and host silencing in the gigantic genomes of salamanders

Jie Wang, Jiaxing Tang, Guangpu Zhang, Shuai Tan, Mueller L.

Rachel [10'+5']

Presenter affiliation: Chengdu Institute of Biology, CAS, Chengdu, China.

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WEDNESDAY, April 9—1:30 PM

Visit to Old Suzhou

WEDNESDAY, April 9—7:00 PM

SESSION 5 MOLECULAR MECHANISM AND CONSEQUENCE

Chairperson: **Yang Zhao**, Zhejiang University, Hangzhou, China

Transposons, a selfish friend in mammalian preimplantation development

Lin He [20'+10']

Presenter affiliation: UC-Berkeley, Berkeley, California.

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Molecular determinants of LINE-1 retrotransposon targeting in human genomes

Gael Cristofari [20'+10']

Presenter affiliation: University Cote d'Azur, INSERM, CNRS, Nice, France.

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Unraveling the role of HERV-H in Parkinson's disease pathogenesis

Hin-Man Tai, Vidya P. Nair, Henryuan Liu, Lucas C. Gomes, Paul Lingor, Dmitrij Frishman, Michelle Vincendeau [10'+5']

Presenter affiliation: Helmholtz Centre Munich, Munich, Germany.

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Transcriptomic landscape of transposable elements reveals *LTR7-PLAAT4* as a novel oncogene and potential therapeutic targets in PAAD

Meilong Shi, Chuanqi Teng, Shan Zhang, Xiaobo He, Lingyun Xu, Ganjun Yu, Jingwen Liu, Yanfeng Wu, Yan Ren, Gang Jin, Jing Li [10'+5']

Presenter affiliation: Second Military Medical University, Shanghai, China.

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Studies of a human transposable element

John V. Moran [20'+10']

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

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Identification and characterization of host factors in promoting retrotransposons in both germline and somatic tissues

Chongyang Li, Zhe Meng, Qiuju Wen, Wenjuan Yang, Yaqian Xu, Yuening Lv, Yile Guo, Tong Lv, Dan Shen, Kun Dou [10'+5']

Presenter affiliation: ShanghaiTech University, Shanghai, China.

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THURSDAY, April 10—9:00 AM

SESSION 6 AGING, CANCER, DISEASE AND THERAPEUTICS

Chairperson: **Jing Li**, Second Military Medical University, Shanghai, China

The yin yang of retrotransposons RNA impact on cell identity, tissue homeostasis and aging

Valerio Orlando [20'+10']

Presenter affiliation: King Abdullah University of Science and Technology KAUST, Thuwal, Saudi Arabia.

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Harnessing transposable elements for genome engineering tools

Haoyi Wang [20'+10']

Presenter affiliation: Institute of Zoology, Chinese Academy of Sciences, Beijing, China.

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From bench to bedside—Personalized antisense oligonucleotide therapy for rare neurodegenerative diseases caused by splice-altering retroelement insertions

Boxun Zhao, Eunjung Alice Lee, Timothy W. Yu [10'+5']

Presenter affiliation: Boston Children's Hospital, Boston, Massachusetts.

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Novel role of LINE-1 ORF1p in masking viral mimicry in pancreatic cancer

Siyu Sun, Eunae You, Jungeui Hong, David Hoyos, Isabella Del Priore, Kaloyan M. Tsanov, Om Mattagajasingh, Hua Jiang, Samira Hozeifi, Daniel Zenklusen, John LaCava, Scott W. Lowe, David T. Ting, Christine A. Iacobuzio-Donahue, Alexander Solovyov, Benjamin D. Greenbaum [10'+5']

Presenter affiliation: Memorial Sloan Kettering Cancer Center, New York, New York.

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Break

Targeted detection of endogenous LINE-1 proteins and ORF2p interactions

Mathias I. Nielsen, Peter C. Fridy, Michael P. Rout, John LaCava [20'+10']

Presenter affiliation: The Rockefeller University, New York, New York.

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Lightning CAR-T cells produced by an optimized DNA transposon system demonstrate significant antitumor effects against hematologic and solid tumors

Chengyi Song, Pingjing Zhang [10'+5']

Presenter affiliation: Yangzhou University, Yangzhou, China.

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The expression of transposable elements in Parkinson's disease

Raquel Garza, Anita Adami, Oliver Tam, Talitha Forcier, Annabel Curle, Diahann Atacho, Annelies Quaegebeur, Joanne Jones, Agnete Kirkeby, Roger Barker, Molly G. Hammel, Johan Jakobsson [10'+5']

Presenter affiliation: Lund University, Lund, Sweden.

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Amplification editing enables efficient and precise duplication of DNA from short sequence to megabase and chromosomal scale

Hao Yin [10'+5']

Presenter affiliation: Wuhan University, Wuhan, China.

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SESSION 7 **PHYSIOLOGICAL CONSEQUENCES**

Chairperson: **Fu Yang**, Wuhan University, Wuhan, China

Chasing the jumping genes

Zhao (ZZ) Zhang [20'+10']

Presenter affiliation: Duke University, Durham, North Carolina. 60

Evolution of transposable elements in natural populations of Arabidopsis

Ya-Long Guo [10'+5']

Presenter affiliation: Chinese Academy of Sciences, Beijing, China. 61

The multifaceted role of transposable elements in placental development

Bin Cao [10'+5']

Presenter affiliation: School of Medicine, Xiamen University, Xiamen, China. 62

Break

IAP retrotransposons contribute to the transcriptional diversity of the murine placenta

Samuele M. Amante, Maria L. Vignola, Cyril Pulver, Marika Charalambous, Miguel R. Branco [20'+10']

Presenter affiliation: Queen Mary University of London, London, United Kingdom. 63

L1 transcription—Genome-wide insights

Xiaowen Hao, Yibin Tao, Ge Zhan, Xiaohua Shen [20'+10']

Presenter affiliation: Tsinghua University, Beijing, China. 64

Tracing the evolutionary origins of the mammalian piRNA pathway in transposon silencing

Xinyu Xiang, Francisco Falcon, Diego Rodriguez-Terrones, Sergej Nowoshilow, Anni Gao, Wanlu Liu, Julius Brennecke, Elly Tanaka, Dónal O'Carroll [10'+5']

Presenter affiliation: Zhejiang University, Haining, China; University of Edinburgh, Edinburgh, United Kingdom. 65

Linking silencing of endogenous retroviruses to brain innate immune cell plasticity and senescence

Xin Yan, Christina Georgopoulou, Hang-Mao Lee, Jenny Russ, Ala Ahrari, Vijay Chandrasekar, Tim Ducksch, Giuliano Crispatzu, Miriam Stork, Emma-Dorothea Zanfi, Manon Chevallot-Beroux, Paolo Salomoni [10'+5']

Presenter affiliation: German Center for Neurodegenerative Diseases (DZNE), Bonn, Germany.

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THURSDAY, April 10—5:00 PM

COCKTAILS and BANQUET

FRIDAY, April 11—9:00 AM

SESSION 8 EVOLUTION, DEVELOPMENT AND INNOVATION

Chairperson: **Xiao-Ou Zhang**, Tongji University, Shanghai, China

Evolution of KoRV—A transcriptional silencing in wild koalas

Tianxiong Yu, Michaela B J. Blyton, Milky Abajorga, Birgit S. Koppetsch, Samantha Ho, Bo Xu, Zhongren Hu, Jeremy Luban, Keith Chappell, Zhiping Weng, William E. Theurkauf [20'+10']

Presenter affiliation: University of Massachusetts Chan Medical School, Worcester, Washington.

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The epigenetic regulation of transposon activity in embryonic development and pluripotency transition

Shaorong Gao [20'+10']

Presenter affiliation: Tongji University, Shanghai, China.

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Evolution of transposable elements and their impact on genomic and phenotypic diversity

Jinfeng Chen [10'+5']

Presenter affiliation: The State Key Laboratory of Integrated Management of Pest Insects and Rodents, Beijing, China.

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SINE retrotransposons link replication timing with higher-order genome organization in mammals by recruiting H2B monoubiquitination at genebody

Jafar Sharif, Haruhiko Koseki [10'+5']

Presenter affiliation: RIKEN Center for Integrative Medical Sciences, Yokohama, Japan.

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Break

How plants discriminate between transposons and genes? - Contribution of histone H2A variants to epigenomic pattern formation.

Shoko Oda, Tetsuji Kakutani, Taiiko K. To [20'+10']

Presenter affiliation: Institute of Science Tokyo, Yokohama, Japan; The University of Tokyo, Tokyo, Japan.

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Origins and consequences of somatic LINE-1 retrotransposition in human normal cells revealed by short- and long-read sequencing

Chang Hyun Nam, Beomki Lee, Young Seok Ju [20'+10']

Presenter affiliation: Korea Advanced Institute of Science and Technology, Daejeon, South Korea.

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Transcription drives LINE1-rich heterochromatin formation at the nucleolar periphery

Ge Zhan, Yibing Tao, Jiaxin Wu, Zirong Wang, Zhonghuai Hou†, Xiaohua Shen [10'+5']

Presenter affiliation: Tsinghua University, Beijing, China.

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