

Jason William Chin

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Updated: January 12th 2023

Professional

- 2018- **Joint Head, Division of Protein & Nucleic Acid Chemistry**
MRC Laboratory of Molecular Biology, Cambridge, UK
- 2018- **Associate Faculty, Synthetic Genomics**
Wellcome Sanger Institute, Cambridge, UK
- 2010- **Head, Centre for Chemical & Synthetic Biology**
MRC Laboratory of Molecular Biology, Cambridge, UK
- 2012- **Professor of Chemistry & Chemical Biology**
Department of Chemistry, University of Cambridge, UK
- 2007- **Programme Leader (tenured)**
MRC Laboratory of Molecular Biology, Cambridge, UK
- 2007- **Fellow in Natural Sciences & Director of Studies in Biochemistry**
Trinity College, Cambridge University, UK
- 2003-2007 **Programme Leader (tenure-track)**
MRC Laboratory of Molecular Biology, Cambridge, UK
- 2001-2003 **Damon Runyon Postdoctoral Fellow**, with Professor Peter G. Schultz.
The Scripps Research Institute, La Jolla, CA, USA
- 1996-2001 **PhD**, with Professor Alanna Schepartz.
Yale University, New Haven, CT, USA
- 1995-1996 **Undergraduate Part II Research**, with Professor John D. Sutherland.
University of Oxford, Oxford Centre for Molecular Sciences, Oxford, UK

Education

Oxford University, Oxford, U.K.	M.A.	1996	Chemistry
Yale University, New Haven, CT, U.S.A.	Ph.D.	2001	Organic Chemistry

Recent Honors & Awards

- 2022 Elected to Fellowship of the Royal Society (FRS)
- 2021 Meyerhof Medal & Lecture, Max Planck Institute Heidelberg
- 2019 Sackler International Prize in the Physical Sciences
- 2016 Elected to Fellowship of the Academy of Medical Sciences (FMedSci)
- 2013 Elected to European Inventor Hall of Fame, European Patent Office
- 2013 Andrew E. Derome Memorial Lectures, Oxford University
- 2011 Louis-Jeantet Foundation Young Investigator Career Award
- 2010 Elected EMBO (European Molecular Biology Organization) Member
- 2010 The EMBO Gold Medal (European Molecular Biology Organization)

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2010	The Corday-Morgan Prize, The Royal Society of Chemistry
2009	The Royal Society Francis Crick Medal & Lecture
2005-2008	EMBO (European Molecular Biology Organization) Young Investigator
2001-2004	Damon Runyon Cancer Research Fund Fellowship
1996-2000	Fulbright Award, The U.S.-U.K. Fulbright Commission
1999	Arthur Wayland Dox Fellowship, Yale University
1998-1999	Sigma Xi-The Consortium for Plasma Science Award

Funding

Our research is primarily funded directly by the Medical Research Council through the PNAC division of LMB and through CCSB. In addition we have obtained the following external funds.

2007-2014	ERC (European Research Council) StG Grant (1.8 Million Euros) <i>(Genetically Encoded Synthesis of Unnatural Biopolymers)</i>
2009-2012	HFSP (Human Frontiers of Science) Program Grant (\$750,000) <i>(Decoding the Physical & Mechanistic Role of Histone Modifications with Designer Nucleosomes, with John vanNoort, Leiden)</i>
2011-2015	Louis-Jeantet Foundation (400,00 CHF) Expanding the Genetic Code of an Animal
2012	MRC, Super-resolution microscopy and imaging centre (1.7 Million GBP) with Nick Barry, Simon Bullock, Hugh Pelham, John Walker
2014	Nikon/MRC Case Studentship (with Nick Barry)
2014	BBSRC, Synthetic Biology and DNA synthesis centre (2 Million GBP) with Hugh Pelham and Philipp Holliger
2015-2022	ERC (European Research Council) Advanced Grant (2.5 Million Euros) <i>(Systematic Genetic Code Reprogramming)</i>
2020-2025	Wellcome Investigator Award (2.7 Million GBP) <i>(Genetic code expansion and compression)</i>
2020-2023	Wellcome Discretionary Award (1.9 Million GBP) <i>(synthesis of large genomes)</i>

Recent Invited Presentations

Collaboratorium Opening Symposium, CRG Barcelona, October 4th-5th 2022
The New Enlightenment, Braemar, Speaker, designing ourselves, September 13th-15th 2022
The Royal Society Club dinner and talk, with H.R.H. Princess Anne, London, 6th June 2022
SynBioVen with David Harding, Henley, keynote, 27th June 2022
TED talk, TED 2022, Vancouver, Canada, April 12th 2022
EMBO Codon usage workshop, Edinburgh (online), April 10th 2022
Accelerating Bioinnovation, Hinxton, 5th April 2022
Microbiology Society Annual Conference, Belfast (online), April 4th 2022
Presentation to UK Prime Minister, Downing Street, London, January 28th 2022
Biodesign Plenary Lecture (online) December 13th 2021
John Ray Society Lecture, St Catherines College Cambridge, November 12th 2021
Xingda Lecture, Peking University (online), November 5th 2021
Kearney CEO retreat, Fireside chat: Reimagining Healthcare (online), October 28th 2021
124th Titisee Conference, October 27th-31st 2021
Meyerhoff Prize Lecture, MPI Heidelberg, October 4th 2021
Boehringer Ingelheim Lecture (online), September 11th 2021
The New Enlightenment, Braemar, September 6th-9th 2021, attendee
SBBS Biozentrum, University of Basel (online), May 11th 2021
Bollum symposium, University of Minnesota (online), May 5th 2021
Rice University, Department of Chemistry & Department of Bioengineering (online) April 14th 2021
KAUST (online), March 30th 2021
Science Museum London, Newton's circle patrons (online), February 18th 2021
Biodesign Conference (online), December 3rd 2020
Max Syn Bio Symposium (online), December 2nd 2020
Life Sciences Across the Globe (Science talk, online), November 11th 2020

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MRC Leaders Conference (online), November 4th 2020
BBSRC DTP Symposium, Cambridge (online), October 26th 2020
Chemical and Synthetic Biology Lecture, Bristol University, December 4th 2019
Sc. 2.0 & GP. Write meeting. New York, Plenary Lecture, November 12th 2019
Evnin Lecture, Rockefeller University, Plenary Lecture, November 11th 2019
Sackler Prize lecture, Tel Aviv, October 23rd 2019
EMBO Workshop: Creating is Understanding, Heidelberg, Plenary Lecture, September 25th 2019
International Workshop on Control Engineering, Oxford, Plenary Lecture, September 10-11th 2019
Zurich Centre for Structural Biology Symposium, Plenary Lecture, August 19-20th 2019
Open Plant meeting, Cambridge, Plenary Lecture, July 22-26th 2019
Synthetic and Systems Biology Summer School, Pisa, Plenary Lecture, July 30th 2019
47th IUPAC World Chemistry Congress, Paris, Plenary Lecture, July 8-11th 2019
Better Biology through Chemistry, Warwick, Plenary Lecture, July 2nd 2019
Bioorthogonal and Bioresponsive Chemistry, Edinburgh, Plenary Lecture, May 6-7th 2019
Advances in Chemical Biology, DECHEMA, Frankfurt, Plenary Lecture, 23rd January 2019.
Dutch Chemical Society, CHAINS, Eindhoven, Plenary Lecture, December 3rd 2018.
ISMB Birkbeck College London, Student Invited Seminar, November 21st 2018.
SynBIC, Imperial College London, Student Invited Lecture, November 20th 2018.
Hong Kong Baptist University, Student Invited Lectures, October 8th and 9th 2018.
VISTEC, Thailand, October 2nd, 2018.
EMBO Symposium: Enzymes, Biocatalysis and Chemical Biology, Pavia, September 10th-11th 2018.
Summer School in Synthetic Biology, University of Copenhagen, August 20th-24th 2018.
Keynote lecture, Genetic Code Expansion Conference, Corvallis, Oregon, August 9th- 11th 2018.
Stanford , August 8th 2018.
UCSF, August 8th 2018.
UC Irvine, August 7th 2018.
QBM Keynote lecture, Munich, June 8th 2018.
Mosbach Symposium, Synthetic Biology, March 22-23rd 2018.
BSS Seminar, Cavendish Laboratory, Cambridge, January 26th 2018.
ISCB, Geneva, Plenary Lecture, January 12th 2018.
ISBC, Kyoto, Plenary Lecture, December 15th 2017.
Riken Structural Biology, Yokohama, December 11th 2017.
UK SynBio, Keynote Lecture, Manchester, November 28th 2017.
EMBL PhD symposium, Keynote Lecture, Bridging the Gaps, October 18th 2017.
Solvay Institute Panel- Future of Chemistry, October 17th 2017.
Molecular Basis of Life, Bochum, September 27th 2017.
Benzon Symposium, Copenhagen, August 20th-24th 2017.
Synthetic Biology CDT, Oxford, June 19th 2017.
Innovations in Biology, Lausanne, June 14th-15th 2017.
IMM, Lisbon 14th May 2017.
Burton Lecture, Kings College London, March 22nd 2017.
Francis Crick Institute, Opening Symposium, March 15th-17th 2017.
Synthetic Biology: does industry get it, Royal Society, February 8th 2017.
CRI Proteomics symposium, Cambridge, 9th November 2016
MindApp Symposium, Vienna Biocenter, Vienna, 3rd-4th November 2016
ENS Chemical Biology Symposium, Paris, 8th December 2016
Labelling and nanoscopy, keynote lecture, Heidelberg, 31st October- 1st November 2016
Heinrich Wieland Prize symposium, honouring Peter Schultz, Munich 13th-14th October 2016
10th Copenhagen Bioscience Conference on Signalling 2nd -5th October 2016
CIPSM, Munich, September 14th 2016
tRNA, JeJu, Korea, September 8th 2016
Peter Schultz 60th Birthday symposium, Scripps Research Institute, June 30th 2016
Sanders Tri-Institutional Chemical Biology Seminar, Rockefeller University June 5th 2016
RSC Chemical Biology Meeting, London, April 27th 2016
Wageningen Symposium, Organic Chemistry, April 6th 2016
UC Irvine, Bioengineering, December 21st 2015

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Cardiff University, Department of Chemistry, October 12th 2015
ECBS, ICBS, Plenary lecture, Berlin, October 9th 2015
Clare Hall, September 10th 2015
Discovery Lecture, University of Dundee, June 26th 2015
Systems and Synthetic Biology lecture, University of Edinburgh, June 25th 2015
Joint Kjledgaard DANDRITE Lecture, Aarhus, May 6th 2015
Swiss Chemical Society Meeting, Basel, April 24th 2015
Institute of Structural and Molecular Biology, London, December 10th 2014
Frontiers in Biology, Institute of Genetics and Development, Rennes, November 28th 2014
Armenise Symposium, Harvard Medical School, November 19th 2014
MIT Biological Chemistry, November 18th 2014
International Student Symposium, MPI Dortmund, November 3rd 2014
EMBL, PhD student symposium, Heidelberg, October 23rd 2014
Horizons in Molecular Biology, PhD student symposium Goettingen, September 18th 2014
Plenary Speaker, 15th Tetrahedron Symposium, London June 26th 2014
International Summer School on Systems and Synthetic Biology, Sicily, June 16-20
Plenary Lecture, EMBO Practical Meeting, Grenoble, June 6th 2014
EMBO Molecular machines (co-organizer and speaker), Heidelberg, May 19th 2014
Keynote lecture, Translational Recoding, Killarney, Ireland, May 16th 2014
Plenary lecture, EU-COST meeting, Cambridge, March 25th 2014
VIB Group Leader retreat, Belgium. March 19th 2014
York, Open Biology lecture, January 15th 2014
NIMR, November 20th 2013
Max Planck Institute of Biochemistry, Martinsried. Distinguished Visitor Lecture, Nov 15th 2013
Solvay Public Lecture, 20th October 2013
23rd Solvay Conference on Chemistry, Brussels, 16th-19th October 2013
Plenary Lecture, Synthetic Biology 6.0, Imperial College London, July 9th-11th
Winton Symposium, Cambridge, September 30th 2013
Andrew E. Derome Memorial Lectures, Oxford University, April 10th & April 11th 2013
Institute of Molecular Medicine, Oxford University, April 9th 2013
UW Madison, Department of Chemistry, March 16th 2013
Keystone meeting, Precision Genome Engineering, March 20th 2013
Stanford University, October 3rd 2012
UC Berkeley, October 4th 2012
UCSF, October 5th 2012
EMBL Chemical Biology Meeting, September 26th-29th 2012, Heidelberg
Protein Society, Chemical Biology Session Chair, August 5th-8th 2012, San Diego
Single Cell Physiology Lecture, Paris, July 22nd-29th 2012.
HFSP Plenary Lecture, S. Korea. July 1st -5th 2012.
Plenary lecture, Challenges in Organic Chemistry & Chemical Biology (ISACS7, Royal Society of Chemistry), Edinburgh, June 12th-15th 2012
Closs Lecture (student invited), University of Chicago, June 1st 2012.
Evnin Lecture in Chemical Biology, Rockefeller University, May 30th 2012.
The Genetics Society meeting, Supermodel Organisms, April 20th 2012.
Pfizer, April 17th 2012
243rd ACS Meeting, Breslow Award Symposium, San Diego, March 28th 2012.
Solvay Discussion meeting, Belgium, February 14-17th 2012.
MIT, Chemistry Department, January 23rd 2012
Science Magazine/AAAS: keynote lecture on Synthetic Biology, Cambridge, October 6th 2011
1st Frontiers between Chemistry & Biology, Peking University, August 19th-24th 2011
25th Anniversary Protein Society Meeting, Boston, July 23rd-27th 2011
46th EUCHEM Conference on Stereochemistry, Burgenstock, May 1st-6th 2011.
Department of Biosystems Science and Engineering (ETH Zurich @ Basel), April 13th 2011
Biochemical Society Lecture, John Innes Centre, March 9th 2011
The Royal College of Art, London, February 18th 2011
The Gurdon Institute, Cambridge, February 15th 2011
Wellcome Trust Centre for Gene Regulation, Dundee, January 24th 2011
Wellcome Trust Centre for Cell Biology, Edinburgh, January 25th 2011

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Corday Morgan Lectures. (Open University, Leicester, Leeds) January 12th, 17th, 20th 2011
Babraham Institute, Cambridge, December 7th 2010
California Institute of Technology, November 16th 2010
The EMBO Meeting, Barcelona, September 7th 2010
Plenary lecture, Challenges in Organic Chemistry & Chemical Biology (ISACS1, Royal Society of Chemistry), San Francisco, July 6th-9th 2010
MRC Human Genetics Unit, Edinburgh, June 10th 2010
ETH Zurich, Chemical Biology Symposium, Department of Chemistry, June 1st 2010
Harvard University, Wyss Institute, May 12th 2010
Yale University, Lecture in Chemical Biology, May 11th 2010
Plenary lecture, Imperial College, London, Chemical Biology Symposium, April 19th 2010
Imperial Cancer Research, April 14th 2010
Van Leeuwenhoek Lecture, Leiden University, March 25th 2010
The Francis Crick Prize Lecture of the Royal Society November 26th 2009
Cambridge University, Organic Chemistry Series, November 23rd 2009
The Mendel Lecture, Brno Czech Republic, October 22nd 2009
Tiselius Symposium, Uppsala University, Sweden, September 6-9th 2009
The Synthetic Biology Symposium of the National Academy of Sciences USA, The Royal Society, & OECD, Washington D.C. July 9th-10th 2009
Princeton University Department of Chemistry, June 15th 2009
American Peptide Symposium, Indiana, June 8-12th
University of Lausanne, BIG lecture, June 2nd 2009
9th Dahlem symposium (Signal Recognition and Transduction), Berlin 25th-26th February 2009.
DFG, German Synthetic Biology strategy meeting, 27th February 2009.
Imperial College, London, January 14th 2009
Life Under (re) Construction, Vienna Biocenter, Research Institute of Molecular Pathology (IMP), the Institute of Molecular Biotechnology of the Austrian Academy of Science (IMBA), Max F. Perutz Laboratories (MFPL) and the Gregor Mendel Institute (GMI), PhD student symposium, Vienna, November 13-14, 2008
Synthetic Biology Workshop, University of Groningen, November 8, 2008.
Plenary lecture, EMBL/EMBO 9th Science & Society Lecture: Systems & Synthetic Biology, EMBL Heidelberg, November 7th, 2008
Department of Biochemistry, Oxford University, October 20th, 2008
Plenary lecture, European Bioprospectives, DECHEMA, Hannover October 7-9, 2008
Synthetic Biology Symposium, Max Planck Institute for Terrestrial Microbiology, Marburg. October 1, 2008.
Keynote lecture, Chemistry in the New World of Bioengineering & Synthetic Biology (Royal Society of Chemistry), Oxford, September 22-24, 2008
American Chemical Society Meeting, Philadelphia, August 17-21 2008
Royal Society Synthetic Biology Discussion Meeting, London, June 2-3, 2008
47th Tutzinger Symposium: Modeling & Engineering of Complex Systems, Tutzinger, May 25-28
Plenary lecture, 2nd International Forum on Biosecurity (The National Academies of the United States, The International Academy on International Issues, The Interacademy Medical Panel, The International Union of Microbial Societies, The International Union of Biochemistry and Molecular Biology, the International Union of Biological Sciences, the Hungarian Academy of Sciences), Budapest March 30 - April 2 2008
London Research Institute, Cancer Research UK (Clare Hall), February 28, 2008
Pasteur Institute, Paris, February 21, 2008
John Innes Centre, Norwich, January 28 2008
London Structural Biology Club, Nov 30, 2007
EMBO Young Investigator Meeting, EMBL, Heidelberg, June 13-15, 2007
Synthetic Biology 3.0, ETH, Zurich, June 24-26, 2007
Yale University Chemical Biology Symposium, June 1, 2007
Institute of Molecular Biology & Biotechnology, Crete, May 23-27, 2007
Protein Engineering Summit, Boston, MA, May 14-15, 2007
Louis Pasteur University, Strasbourg, April 23, 2007

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Ministry of Defense: Chemical and Biological Technology Forecasting, Porton Down, March 20-21, 2007
BBSRC Workshop on Synthetic Biology: Setting the agenda for Synthetic Biology in the UK, Swindon, February 8-9, 2007
National Institute for Medical Research (NIMR), January 18, 2007
University of York, Department of Biology, October 20, 2006
Bioorganic Chemistry Gordon Conference, Oxford, July 31, 2006
iGEM (International Genetically Engineered Machines) Cambridge University, July 7, 2006
Expert Panel Meeting on Novel Platform Technologies, Cambridge Antibody Technology, March 27-28, 2006
Recombinant DNA Technology in the 21st Century, Biochemical Society, Astra Zeneca, Loughborough, November 21-22, 2005
University of Manchester, School of Chemistry, November 16, 2005
Weizmann Institute, Israel, November 13, 2005
International Protein Engineering Conference, Ein Gedi, Israel, November 10-12, 2005
Boston University, November 2005
Rockefeller University, 2004

Professional Activities

Reviewer:

Journals: *Nature*, *Nature Methods*, *Nature Reviews Molecular Cell Biology*, *Journal of the American Chemical Society*, *Angewandte Chemie*, *Cell*, *Journal of Biological Chemistry*, *ACS Chemical Biology*, *Nature Chemical Biology*, *P.N.A.S. Science*.
Funding Agencies: *Biotechnology & Biological Sciences Research Council (BBSRC, UK)*, *Engineering & Physical Sciences Research Council (EPSRC, UK)*, *European Molecular Biology Organization (EMBO) fellowships*. *European Research Council*.

Committees: *Advisory Member of the Royal Society Synthetic Biology Policy Coordination Group (2008-2009)*; *LMB Seminar Committee (2004-2010)*; *International Program Committee for the XXth International Congress of Genetics, Berlin 2008, German Genetics Society*; *Royal Society Synthetic Biology meeting committee (2008)*; *EMBO Molecular Machines organizing committee (2014)*; *EP Abraham Fund Advisory Board, Oxford University (2014-)*; *MaxSynBio Advisory Board, Max Plank Society (2015-2020)*; *ETH Biosystems Engineering Faculty Panel, ETH Zurich (2015)*. *ERC Life Sciences Panel (2017-)*; *ETH Zurich D-BSSE review panel (2017)*. *MRC Unit and Centre Portfolio Review, Main Panel (2020)*. *Academy of Medical Sciences, Sectional Committee 1. Prime Minister Council for Science and Technology, Engineering Biology sub-group (2022)*

Editorial: *Chemical Science* (RSC, Editorial Advisory Board 2010-), *Cell Chemical Biology* (Cell Press, Editorial Board, Sept 2009-present), *Current Opinion in Chemical Biology* (Editorial Board 2011- present, Biopolymers Section Editor 2007, Synthetic Biology Section Editor 2012), *Protein Engineering Design & Selection* (2007-present), *ACS Synthetic Biology* (Editorial Board 2011-present), *Faculty 1000* (2011-2015), *Journal of the Royal Society*, *Interface* (2011-2015). *Open Biology*, *Royal Society* (Editorial Board, 2012-2015)

Other service: Ambrx (consulting, 2003), Cambridge Antibody Technology/Astra-Zeneca (consulting, 2005-2007), Synaffix (SAB, 2015-), Orbit Discovery (SAB, 2015-2021), Genus (NED, 2021-), Constructive Biology Ltd (Founder and CSO, 2022-)

Teaching & Examination: iGEM (International Genetically Engineered Machines) lecturer 2006, 2007 (Cambridge University). Trinity college supervisions (Molecules in Medical Sciences, 2007-2011; Biochemistry and Molecular Biology, 2015-), Part III Chemistry, Nucleic Acids (Cambridge University 2012-).

Patents & Patent Applications (3 of greater than 10)

Compositions and Methods Relating to Orthogonal Ribosome•mRNA pairs., filed July 15 2005, 60/699,693, EP1907545 B1, Oliver Rackham & Jason W. Chin.

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An Expanded Eukaryotic Genetic Code, TSRI 0619, filed June 17, **2003**, Chin, J. W., Cropp, T. A. Anderson, J. C., Schultz, P. G. 435006000 (USPTO), C12Q001/68 (Intl Class).

Miniature Proteins for DNA and Protein Binding, Yale University, WO0181375 **2001**, Alanna Schepartz Shrader, Jason W. Chin, Reena Zutshi, Stacey Rutledge, Joanne Kehlbeck Martin, Neal Zondlo.

Publications

- (147) Genetically programmed cell-based synthesis of non-natural peptide and depsipeptide macrocycles. M. Spinck, C. Piedrafita, W. E. Robertson, T. S. Elliott, D. Cervettini, D. de la Torre, J. W. Chin. *Nature Chem.* **2023**. 15: 61-69.
- (146) Refactored genetic codes enable bidirectional genetic isolation. J. F. Zurcher, W. E. Robertson, T. Kappes, G. Petris, T. S. Elliott, G. P. C. Salmond, J. W. Chin. *Science* **2022**. 378: 516-523.
- (145) Bacterial divisome protein FtsA forms curved antiparallel double filaments when binding to FtsN. T. Nierhaus, S. H. McLaughlin, F. Bürmann, D. Kureisaite-Ciziene, S. L. Maslen, J. M. Skehel, C. W. H. Yu, S. Freund, L. F. H. Funke, J. W. Chin, Jan Löwe. *Nature Microbiol.* **2022**. 7: 1686-1701.
- (144) Cryptochrome 1 as a state variable of the circadian clockwork of the suprachiasmatic nucleus: Evidence from translational switching. D. McManus, L. Polidarova, N. J. Smyllie, A. P. Patton, J. E. Chesham, E. S. Maywood, J. W. Chin, M. H. Hastings. *Proc. Natl. Acad. Sci.* **2022**. 119: e2203563119
- (143) Discovery and Genetic Code Expansion of a Polyethylene Terephthalate (PET) Hydrolase from the Human Saliva Metagenome for the Degradation and Bio-Functionalization of PET. B. Eiamthong, P. Meesawat, T. Wongsatit, J. Jitdee, R. Sangsri, M. Patchsung, K. Aphicho, S. Suraritdechachai, N. Huguenin-Dezot, S. Tang, W. Suginta, B. Paosawatyanong, M. M. Babu, J. W. Chin, D. Pakotiprapha, W. Bhanthumnavin, C. Uttamapinant. *Angew Chemie Int. Ed.* **2022**. e202203061.
- (142) RBBP6 activates the pre-mRNA 3' end processing machinery in human cells. V. Boreikaite, T. S. Elliott, J. W. Chin, L. A. Passmore. *Genes & Dev.* **2022**. 36: 210-224.
- (141) Mechanism-based traps enable protease and hydrolase substrate discovery. S. Tang, A. T. Beattie, L. Kafkova, G. Petris, N. Huguenin-Dezot, M. Fiedler, M. Freeman, J. W. Chin. *Nature.* **2022**. 602: 701-707.
- (140) Cryptochrome proteins regulate the circadian intra-cellular behaviour and localization of PER2 in mouse suprachiasmatic nucleus neurons. N. J. Smyllie, J. Bagnall, A. A. Koch, D. Niranjana, L. Polidarova, J. E. Chesham, J. W. Chin, C. L. Partch, A. S. I. Loudon, M. H. Hastings. *Proc. Natl. Acad. Sci.* **2022**. 119: e2113845119
- (139) Cryo-EM structure of MukBEF reveals DNA loop entrapment at chromosomal unloading sites. F. Burman, L. F. H. Funke, J. W. Chin, J. Löwe. *Mol. Cell.* **2021**. 81: 4891-4906.
- (138) Precise optical control of gene expression in *C. elegans* using improved genetic code expansion and Cre recombinase. L. Davis, I. Radmann, A. Goutou, A. Tynan, K. Baxter, Z. Xi, J. M. O'Shea, J. W. Chin, S. Greiss. *eLife* **2021**. 10:e67075.
- (137) A 68-codon genetic code to incorporate four distinct non-canonical amino acids enabled by automated orthogonal mRNA design. D. L. Dunkelmann, S. B. Oehm, A. T. Beattie, J. W. Chin. *Nature Chem.* **2021**. 13: 1110-1117.

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- (136) Sense codon reassignment enables viral resistance and encoded polymer synthesis. W. E. Robertson, L. F. H. Funke, D. de la Torre, J. Fredens, T. S. Elliott, M. Spinck, Y. Christova, D. Cervettini, F. L. Boge, K. C. Liu, S. Buse, S. Maslen, G. P. Salmond, J. W. Chin. *Science* **2021**. 372: 1057-1062.
- (135) Creating custom synthetic genomes in *Escherichia coli* with REXER and GENESIS. W. E. Robertson, L. F. H. Funke, D. de la Torre, J. Fredens, K. Wang, J. W. Chin. *Nature Protocols* **2021**. 16: 2345-2380.
- (134) Selective CRAF inhibition elicits transactivation. C. W. Morgan, I. L. Dale, A. P. Thomas, J. Hunt, J. W. Chin. *J. Am. Chem. Soc.* **2021**. 143: 4600-4606.
- (133) High-efficacy subcellular micropatterning of proteins using fibrinogen anchors. J. L. Watson, S. Aich, B. Oller-Salvia, A. A. Drake, S. C. Blacklow, J. Chin, E. Derivery. *J. Cell. Biol.* **2021**. 220 (2): e202009063.
- (132) Reprogramming the genetic code. D. de la Torre, J. W. Chin. *Nature Reviews Genetics*. **2021**. 22: 169-184.
- (131) Engineered triply orthogonal pyrrolysyl-tRNA synthetase/tRNA pairs enable the genetic encoding of three distinct non-canonical amino acids. D. L. Dunkelmann, J. C. W. Willis, A. T. Beattie, J. W. Chin. *Nature Chem.* **2020**. 12: 535-544.
- (130) Rapid discovery and evolution of orthogonal aminoacyl-tRNA synthetase/tRNA pairs. D. Cervettini, S. Tang, S. D. Fried, J. C. W. Willis, L. F. Funke, L. J. Colwell, J.W. Chin. *Nature Biotech.* **2020**. 38:989-999.
- (129) Alcohol-derived DNA crosslinks are repaired by two distinct mechanisms. M. R. Hodson, A. Bolner, K. Sato, A. N. Kamimae-Lanning, K. Rooijers, M. Mohan, J. Silhan, M. Petek, D. M. Williams, J. Kind, J. W. Chin, K. J. Patel, P. Knipscheer. *Nature* **2020**. 579: 603-608.
- (128) Programmed chromosome fission and fusion enable precise large-scale genome rearrangements and assembly. K. Wang, D. de la Torre, W. E. Robertson, J.W. Chin. *Science* **2019**. 365: 922-926.
- (127) Efficient phage display with multiple distinct non-canonical amino acids using orthogonal ribosome mediated genetic code expansion. B. Oller-Salvia, J. W. Chin. *Angew. Chem.* **2019**. 58: 10844-10848.
- (126) Total synthesis of *Escherichia coli* with a recoded genome. J. Fredens, K. Wang, D. de la Torre, L. F. H. Funke, W. E. Robertson, Y. Christova, T. Chia, W. H. Schmied, D. L. Dunkelmann, V. Beranek, C. Uttamapinant, A. Gonzalez Llamazares, T. S. Elliott, J. W. Chin. *Nature* **2019**. 569: 514-518.
- (125) Trapping biosynthetic acyl-enzyme intermediates with encoded 2,3-diaminopropionic acid. N. Huguenin-Dezot, D. A. Alonzo, G. W. Heberlig, M. Mahesh, D. P. Nguyen, M. H. Dornan, C. N. Boddy, T. M. Schmeing, J. W. Chin. *Nature* **2019**. 565: 112-117.
- (124) Controlling orthogonal ribosome subunit interactions enables evolution of new function. W. H. Schmied, Z. Tnimov, C. Uttamapinant, C. D. Rae, S. D. Fried, J.W. Chin. *Nature* **2018**. 564: 444-448.
- (123) Translational switching of Cry1 protein expression confers reversible control of circadian behavior in arrhythmic Cry-deficient mice. E. Maywood, T. Elliott, A. Patton, T. Krogager, J. Chesham, R. Ernst, V. Beranek, J. W. Chin, M. H. Hastings. *Proc. Natl. Acad. Sci.* **2018**. 115: E12388-12397.

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- (122) An Evolved *Methanomethylophilus alvus* Pyrrolysyl-tRNA Synthetase/tRNA pair is Highly Active and Orthogonal in Mammalian Cells. V. Beranek, J. W. Chin. *Biochemistry* **2019**. 58: 387-390.
- (121) A conformational sensor based on genetic code expansion reveals an autocatalytic component in EGFR activation. M. Baumdick, M. Gelleri, C. Uttamapinant, V. Beranek, J. W. Chin, P. I. H. Bastiaens. *Nature Comms*. **2018**. 9: 3874.
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