

Prof. Yizhi Patrick CAI

CAREER

AUG 2017-Current	Chair Professor of Synthetic Genomics Manchester Institute of Biotechnology , University of Manchester, UK
MAR 2017-Jul, 2017	Reader School of Biological Sciences , University of Edinburgh, UK
JUL 2013-Jul, 2017	Chancellor's Fellow and Principal Investigator School of Biological Sciences , University of Edinburgh, UK
JUN 2010-Jun 2013	Postdoc Research Fellow with Autodesk Distinguished Scholarship Johns Hopkins University , Baltimore, USA Advisor: Prof. Jef Boeke

OTHER POSITIONS

APR 2018-Current	Visiting Research Professor Hong Kong University , Hong Kong, China
MAR 2018-Current	Associate Faculty in Synthetic Genomics Wellcome Trust Sanger Institute , UK
NOV 2016-Current	Founding co-Chair International Synthetic Genome Centre , National Gene Bank and BGI, China
JUL 2013-Current	International Coordinator International Synthetic Yeast Consortium
AUG 2011-Current	Senior Scientific Consultant Beijing Genomics Institute , Shenzhen, China
FEB 2014-Oct, 2016	Founding co-Director Edinburgh Genome Foundry , University of Edinburgh, UK
DEC 2016-Jul, 2017	Full Member Wellcome Trust Centre for Cell Biology , University of Edinburgh, UK

DEGREES AWARDED

JAN 2007-May 2010	Ph.D in Genetics, Bioinformatics and Computational Biology Virginia Tech , Virginia, USA Advisor: Prof. Jean Peccoud
SEP 2005-Nov 2006	Master of Sciences, majored in Bioinformatics University of Edinburgh , Edinburgh, UK Advisor: Prof. Gordon Plotkin
SEP 2001-Jun 2005	Bachelor of Engineering in Computer Sciences, Talented Student Program Central South University , Changsha, China Advisor: Prof. Sanding Luo

CURRENT GRANTS

8. Dec 2020 - Nov 2022, Wellcome Trust, "Human genome synthesis." (£1.98M), Role: co-PI

7. **Oct 2020 - Sep 2022**, University of Manchester - Chinese University Hong Kong, “Rhizobium genome refactoring for climate-smart agriculture.” (£22.5K), Role: PI
6. **Mar 2019 - Feb 2024**, Volkswagen Foundation, “Genome SCRaMbLEing: an experimental approach to understand life’s organization at a molecular level” (€1.3M), Role: UK PI
5. **Oct 2018 - Sep 2021**, Royal Society Newton Advanced Fellowship, “Dissect the function of repetitive ribosomal DNA using synthetic biology approaches” (£111,000), Role: Hosting PI
4. **Aug 2018 - Jul 2023**, Hong Kong University, “Visiting Research Professor Award” (HKD \$500,000), Role: PI
3. **Mar 2018 - Feb 2023**, Sanger Institute, “Associate Faculty Award” (£200,000), Role: PI
2. **Oct 2017 - Dec 2020**, BBSRC, “From genetic parts to neochromosome in yeast” (£549,000), Role: PI
1. **Feb 2015 - Sep 2021**, BBSRC, MRC, EPSRC, “Edinburgh Mammalian Synthetic Biology Research Centre” (£14M), Role: co-PI

COMPLETED GRANTS

18. **Apr 2015 - Dec 2018**, EPSRC, “Engineering synthetic chromosomes from array based oligo pools to study chromosome segregation mechanisms” (£66K), Role: PI
17. **Jan 2018 - Dec 2018**, EPSRC, “An engineering platform for rapid prototyping synthetic genetic networks” (£125,000), Role: PI
16. **Jul 2018 - Dec 2018**, BBSRC Innovation Fellowship, “Collaborative effort to develop synthetic genomics technologies for industrial biotech” (£39,999), Role: PI
15. **Jun 2018 - May 2019**, UoM-Chinese University Hong Kong Research Fund, “Collaborative Effort to Engineer Synthetic Yeast Genome for Producing Biobutanol” (£5,000), Role: PI
14. **Jan 2016 - Jun 2018**, Bill & Melinda Gates Foundation, “A synthetic biology platform for rapid generation of highly diverse natural product-like compounds active against *Mycobacterium tuberculosis*” (\$2M), Role: UK-PI
13. **Apr 2017 - Mar 2018**, IBIOIC, “Accelerating industrial metabolic engineering using Yeast-FAB” (£500,000), Role: PI
12. **Aug 2014 - Feb 2018**, EPSRC, “Business modeling for DNA synthesis” (£66K), Role: PI
11. **Jan 2015 - Dec 2017**, EraSynbio, “Inducible Evolution of Synthetic Genomes” (€3.2M), Role: UK PI
10. **Sep 2016 - Mar 2017**, BBSRC, “Activity to support identification and prioritisation of challenges around environmental sustainability in China and other DAC countries in the Southeast Asia region’ (£20,000), Role: PI
9. **Sep 2016 - Mar 2017**, EPSRC, “CRISPR up in the cloud – an exploratory collaboration between Edinburgh Genome Foundry and Desktop Genetics” (£51,846), Role: PI
8. **Jan 2016 - Dec 2016**, EPSRC IAA with Autodesk, “Collaborative software engineering for genome synthesis” (£90,703), Role: PI
7. **Jan 2016 - Dec 2016**, EPSRC IAA with GSK, “Synthetic biology route for the sustainable production of a key antibiotic/industrial related molecule” (£27,347), Role: PI
6. **Sep 2013 - Aug 2016**, Autodesk, “Engineering Neochromosomes” (£44K), Role: PI
5. **Feb 2015 - 2016**, BBSRC, “Phenotypical Assay Development Platforms” (£2.4M), Role: co-PI
4. **Feb 2015 - Feb 2016**, BBSRC, “Building national hardware and software infrastructure for UK DNA Foundries” (£1.99M), Role: PI

3. **Apr 2015 - Apr 2016**, IBiolC, “A synthetic metabolon for D-hydroxy phenylglycine methyl ester production” (£241K), Role: co-PI
2. **Sep 2014 - Sep 2015**, BBSRC, “Edinburgh Genome Foundry” (£2M), Role: co-PI
1. **Apr 2014 - 2015**, Wellcome Trust, “Edinburgh Repository of Genetic Parts” (£57K), Role: PI

PUBLICATIONS

63. MacKay MJ, Hooker AC, Afshinnekoo E, Salit M, Kelly J, Feldstein JV, Haft N, Schenkel D, Nambi S, Cai Y, Zhang F, Church G, Dai J, Wang CL, Levy S, Huber J, Ji HP, Kriegel A, Wyllie AL, Mason CE (2020). The COVID-19 XPRIZE and the need for scalable, fast, and widespread testing. **Nat Biotechnol.** 2020 Sep;38(9):1021-1024. doi: 10.1038/s41587020-06554.PMID: 32820257
62. Swidah R, Auxillos J, Liu W, Jones S, Chan TF, Dai J, Cai Y (2020). SCRaMBLE-in: A fast and efficient method to diversify and improve the yields of heterologous pathways in synthetic yeast. **Methods Mol Biol.** 2020;2205:305-327. doi: 10.1007/978-1-0716-0908-8_17. (Corresponding author). PMID: 32809206
61. Dai J, Boeke JD, Luo Z, Jiang S, Cai Y (2020). Sc3.0: revamping and minimizing the yeast genome. **Genome Biol.** 2020 Aug 13;21(1):205. doi: 10.1186/s1305902002130z. (Corresponding author). PMID: 32791980
60. Zhao Y, Yao Z, Ploessl D, Ghosh S, Monti M, Schindler D, Gao M, Cai Y, Qiao M, Yang C, Cao M, Shao Z (2020). Leveraging the Hermes Transposon to Accelerate the Development of Nonconventional Yeast-based Microbial Cell Factories. **ACS Synth Biol.** 2020 Jul 17;9(7):1736-1752. doi: 10.1021/acssynbio.0c00123. Epub 2020 Jun 16. PMID: 32396718
59. Luo Z, Hoffmann SA, Jiang S, Cai Y, Dai J (2020). Probing eukaryotic genome functions with synthetic chromosomes. **Exp Cell Res.** 2020 May 1;390(1):111936. Epub 2020 Mar 9. (Corresponding author). PMID: 32165165
58. Lin Y, Zou X, Zheng Y, Cai Y, Dai J (2019). Improving Chromosome Synthesis with a Semiquantitative Phenotypic Assay and Refined Assembly Strategy. **ACS Synth Biol.** 2019 Oct 18;8(10):2203-2211. doi: 10.1021/acssynbio.8b00505. Epub 2019 Sep 20. PMID: 31532633
57. Hillson N, Caddick M, Cai Y, Carrasco JA, Chang MW, Curach NC, Bell DJ, Le Feuvre R, Friedman DC, Fu X, Gold ND, Herrgård MJ, Holowko MB, Johnson JR, Johnson RA, Keasling JD, Kitney RI, Kondo A, Liu C, Martin VJJ, Menolascina F, Ogino C, Patron NJ, Pavan M, Poh CL, Pretorius IS, Rosser SJ, Scrutton NS, Storch M, Tekotte H, Travnik E, Vickers CE, Yew WS, Yuan Y, Zhao H, Freemont PS (2019). Building a global alliance of biofoundries. **Nature Communications.** 2019 May 9;10(1):2040. doi: 10.1038/s41467-019-10079-2. PMID: 31068573
56. Auxillos JY, Garcia-Ruiz E, Jones S, Li T, Jiang S, Dai J, Cai Y (2019). Multiplex Genome Engineering for Optimizing Bioproduction in *Saccharomyces cerevisiae*. **Biochemistry.** 2019 Mar 19;58(11):1492-1500. doi: 10.1021/acs.biochem.8b01086. Epub 2019 Mar 8. PMID: 30817136
55. Jones S, Martella A, Cai Y (2018). EMMA assembly explained: A step-by-step guide to assemble synthetic mammalian vectors. **Methods Enzymol.** 2019;617:463-493. doi: 10.1016/bs.mie.2018.12.017. Epub 2019 Feb 13. PMID: 30784414
54. Luo Z, Yang Q, Geng B, Jiang S, Yang S, Li X, Cai Y, Dai J (2018). Whole genome engineering by synthesis. **Sci China Life Sci.** 2018 Dec;61(12):1515-1527. doi: 10.1007/s11427-018-9403-y. Epub 2018 Nov 20. PMID: 30465231
53. Akhtar MK, Vijay D, Umbreen S, McLean CJ, Cai Y, Campopiano DJ, Loake GJ (2018). Hydrogen Peroxide-Based Fluorometric Assay for Real-Time Monitoring of SAM-Dependent

Methyltransferases. **Front Bioeng Biotechnol.** 2018 Oct 18;6:146. doi: 10.3389/fbioe.2018.00146. eCollection 2018. PMID: 30406092

52. Garcia-Ruiz E, Li T, Auxillos J, Dai J, Cai Y (2018). YeastFab: high throughput genetic parts construction, measurement and pathway engineering in yeast .**Methods in Enzymology.** 2018;608:277-306. doi: 10.1016/bs.mie.2018.05.003. (Corresponding author). PMID: 30173765
51. Li T, Chen X, Cai Y, Dai J (2018). Artificial Protein Scaffold System (AProSS): An Efficient Method to Optimize Exogenous Metabolic Pathways in *Saccharomyces cerevisiae*. **Metabolic Engineering.** 2018 Jul 23;49:13-20. doi: 10.1016/j.ymben.2018.07.006. (Corresponding author). PMID: 30010058.
50. Schindler D, Dai J, Cai Y (2018). Synthetic genomics: a new venture to dissect genome fundamentals and engineer new functions . **Current Opinion in Chemical Biology.** 2018 May 8;46:56-62. doi: 10.1016/j.cbpa.2018.04.002. (Corresponding author). PMID: 29751161.
49. Liu W, Luo Z, Wang Y, Pham N, Tuck L, Pérez-Pi I, Liu L, Shen Y, French C, Auer M, Jon Marles-Wright J, Dai J, Cai Y (2018). Rapid pathway prototyping and engineering using *in vitro* and *in vivo* synthetic genome SCRaMbLE-in methods. **Nature Communications.** 2018 May 22;9(1):1936. doi: 10.1038/s41467-018-04254-0.(Corresponding author).PMID: 29789543
48. Luo Z, Wang L, Wang Y, Zhang W, Guo Yakun, Shen Y, Jiang L, Wu Q, Zhang C, Cai Y, Dai J (2018). Identifying and characterizing SCRaMbLEd synthetic yeast using ReS-CuES. **Nature Communications.** 2018 May 22;9(1):1930. doi: 10.1038/s41467-017-00806-y. (Corresponding author). PMID: 29789541.
47. Xie ZX., Liu D., Li BZ., Zhao M., Zeng BX., Wu Y., Shen Y., Lin T., Yang P., Dai J., Cai Y., Yang H., Yuan YJ (2017). Design and chemical synthesis of eukaryotic chromosomes. **Chemical Society Reviews.** 2017 Nov 2. doi: 10.1039/c7cs00208d. [Epub ahead of print]. PMID: 29094136.
46. Craig T, Holland R, D'Amore R, Johnson JR, McCue HV, West A, Zulkower V, Tekotte H, Cai Y, Swan D, Davey RP, Hertz-Fowler C, Hall A, Caddick M (2017). Leaf LIMS: A Flexible Laboratory Information Management System with a Synthetic Biology Focus. **ACS Synth Biol.** 2017 Sep 13. doi: 10.1021/acssynbio.7b00212. [Epub ahead of print]. PMID: 28877583.
45. Dai J., Cai Y., Yuan Y, Yang H, Boeke J. (2017), Whole genome synthesis: from poliovirus to synthetic yeast. **Quantitative Biology.** 2017, 5(1): 105–109. doi 10.1007/s40484-017-0101-x.
44. Liu W, Tuck LR, Wright JM, Cai Y (2017). Using purified tyrosine site-specific recombinases *in vitro* to rapidly construct and diversify metabolic pathways. **Methods Mol Biol.** 2017, 1642:285-302. doi: 10.1007/978-1-4939-7169-5_18. (Corresponding author). PMID: 28815507.
43. Jia B, Qi H, Li BZ, Pan S, Liu D, Liu H, Cai Y, Yuan YJ (2017). Orthogonal ribosome bio-firewall. **ACS Synth Biol.** 2017 Aug 7. doi: 10.1021/acssynbio.7b00148. [Epub ahead of print]. PMID: 28783349
42. Ting Yuan, Yakun Guo, Junkai Dong, Tianyi Li, Tong Zhou, Kaiwen Sun, Mei Zhang, Qingyu Wu, Zhen Xie, Yizhi Cai, Limin Cao, Junbiao Dai. (2017), Construction, characterization and application of a genome-wide promoter library in *Saccharomyces cerevisiae*. **Frontiers of Chemical Science and Engineering.** doi: 10.1007/s11705-017-1621-7.
41. Zahn, et al. (2017), Building on nature's design. **Science.** 2017 Mar 10; 355 (6329): 1038-1039. doi: 10.1126/science.355.6329.1038. PMID: 28280198.

40. Martella, A, Matjusaitis, M, Auxillos, J, Pollard, S, Cai, Y. (2017), EMMA: an Extensible Mammalian Modular Assembly toolkit for the rapid design and production of diverse expression vectors. **ACS Synthetic Biology**. (Corresponding author). PMID: 28418644.
39. Shen et al. (2017), A 770kb fully synthetic yeast chromosome II reveals genomic plasticity and robustness through deep functional profiling. **Science**. 2017 Mar 10;355(6329). pii: eaaf4791. doi: 10.1126/science.aaf4791. (Corresponding author). PMID: 28280153.
38. Richardson, et al. (2017), Design of a synthetic yeast genome. **Science**. 2017 Mar 10;355(6329):1040-1044. doi: 10.1126/science.aaf4557. PMID: 28280199.
37. Guillaume et al. (2017), 3D organization of synthetic and scrambled chromosomes. **Science**. 2017 Mar 10;355(6329). pii: eaaf4597. doi: 10.1126/science.aaf4597. PMID: 28280150.
36. Xie, et al. (2017), Synthetic chromosome V: Behavior of ring derivatives and approaching a variant-free designer chromosome. **Science**. 2017 Mar 10;355(6329). pii: eaaf4704. doi: 10.1126/science.aaf4704. PMID: 28280151.
35. Mitchell, et al. (2017), Synthesis, debugging and consolidation of synthetic chromosomes in yeast: synVI and beyond. **Science**. 2017 Mar 10;355(6329). pii: eaaf4831. doi: 10.1126/science.aaf4831. PMID: 28280154.
34. Zhang, et al. (2017), Synthetic yeast chromosome XII: morphing species identity. **Science**. 2017 Mar 10;355(6329). pii: eaaf3981. doi: 10.1126/science.aaf3981. PMID: 28280149.
33. Wu, et al. (2017), Bug-mapping and fitness testing of chemically synthesized chromosome X in Yeast. **Science**. 2017 Mar 10;355(6329). pii: eaaf4791. doi: 10.1126/science.aaf4791. PMID: 28280153.
32. Cai Y, Dai J. (2017), Methods to Synthesize Large DNA Fragments for a Synthetic Yeast Genome. **Cold Spring Harb Protoc**. 2017 Mar 1; 2017. doi: 10.1101/pdb.prot080978 (Corresponding author). PMID: 28250211
31. Agmon, et al. (2017), Low escape-rate genome safeguards with minimal molecular perturbation of *Saccharomyces cerevisiae*. **Proc Natl Acad Sci U S A**. 2017 Feb 21;114(8):E1470-E1479. doi: 10.1073/pnas.1621250114. PMID: 28174266
30. Walker RS, Cai Y (2016). The Fifth Annual Sc2.0 and Synthetic Genomes Conference: Synthetic Genomes in High Gear. **ACS Synth Biol**. 2016 Sep 16;5(9):920-2. doi: 10.1021/acssynbio.6b00227. **ACS Synthetic Biology** (Corresponding Author). PMID: 27633830
29. Ellis T, Cai Y (2016). Synthetic Biology in Europe Special Issue Editorial. **ACS Synthetic Biology** 2016 Oct 21;5(10):1033. (Corresponding Author). PMID: 27764945
28. Qin, Y, Tan, C., Lin, J., Qin, Q., He, J., Wu, Q., Cai, Y., et al. (2016) EcoExpress-Highly Efficient Construction and Expression of Multicomponent Protein Complexes in *Escherichia coli*. 2016 Nov 18;5(11):1239-1246. **ACS Synthetic Biology**. PMID: 27345099.
27. Martella A, Pollard SM, Dai J, Cai Y (2016). Mammalian Synthetic Biology: Time for Big MACs. 2016 Oct 21;5(10):1040-1049. **ACS Synthetic Biology**. PMID: 27076218
26. Boeke, J., Church, G., Hessel, A., Kelley NJ., Arkin, A., Cai, Y., et al. (2016) GENOME ENGINEERING. The Genome Project-Write. 2016 Jul 8;353(6295):126-7. doi: 10.1126/science.aaf6850. **Science**. PMID: 27256881.
25. Quinn J.Y., Cox R.S., Adler A., Beal J., Bhatia S., Cai Y., Chen J., Clancy K., Galdzicki M., Hillson N.J., et al. (2015) SBOL Visual: A Graphical Language for Genetic Designs. 2015 Dec 3;13(12):e1002310. doi: 10.1371/journal.pbio.1002310. **PLoS Biology**. PMID: 26633141
24. Shen, Y., Stracquadanio, G., Wang, Y., Yang, K., Mitchell, L.A., Xue, Y., Cai, Y., Chen, T., Dymond, J.S., Kang, K., et al. (2015) SCRaMbLE generates designed combinatorial stochastic diversity in synthetic chromosomes. 2016 Jan;26(1):36-49. doi: 10.1101/gr.193433.115. **Genome Research**. PMID: 26566658.

23. Kanigowska P, Shen Y, Zheng Y, Rosser S, Cai Y (2015) Smart DNA Fabrication Using Sound Waves: Applying Acoustic Dispensing Technologies to Synthetic Biology. 2016 Feb;21(1):49-56. doi: 10.1177/2211068215593754. **Journal of the Association for Laboratory Automation**. (Corresponding Author). PMID: 26163567.
22. Guo Y, Dong J, Zhou T, Auxillos J, Li T, et al. (2015) YeastFab: the design and construction of standard biological parts for metabolic engineering in *Saccharomyces cerevisiae*. 2015 Jul 27;43(13):e88. doi: 10.1093/nar/gkv464. **Nucleic Acids Res**. (Corresponding Author). PMID: 25956650.
21. Mitchell LA, Chuang J, Agmon N, Khunsriraksakul C, Phillips NA, et al. (2015) Versatile genetic assembly system (VEGAS) to assemble pathways for expression in *S. cerevisiae*. 2015 Jul 27;43(13):6620-30. doi: 10.1093/nar/gkv466. **Nucleic Acids Res**. PMID: 25956652.
20. Agmon N, Mitchell LA, Cai Y, Ikushima S, Chuang J, et al. (2015) Yeast Golden Gate (yGG) for efficient assembly of *S. cerevisiae* transcription units. 2015 Jul 17;4(7):853-9. doi: 10.1021/sb500372z. **ACS Synth Biol**. PMID: 25756291.
19. Cai Y, Agmon N, Choi WJ, Ubide A, Stracquadanio G, et al. (2015) Intrinsic biocontainment: Multiplex genome safeguards combine transcriptional and recombinational control of essential yeast genes. 2015 Feb 10;112(6):1803-8. doi: 10.1073/pnas.1424704112. **Proceedings of the National Academy of Sciences (PNAS)**. (Corresponding Author). PMID: 25624482.
18. Cai Y, Agmon N, Choi WJ, Ubide A, Stracquadanio G, et al. (2015) Intrinsic biocontainment: Multiplex genome safeguards combine transcriptional and recombinational control of essential yeast genes. 2015 Feb 10;112(6):1803-8. doi: 10.1073/pnas.1424704112. **Proceedings of the National Academy of Sciences (PNAS)**. (Corresponding Author). PMID: 25624482.
17. Trubitsyna M, Michlewski G, Cai Y, Elfick A, French CE (2014) PaperClip: rapid multi-part DNA assembly from existing libraries. 2014 Nov 10;42(20):e154. doi: 10.1093/nar/gku829. **Nucleic Acids Research**. PMID: 25200084
16. Scher E, Luo Y, Berliner A, Olguin C, Cai Y (2014) GenomeCarver: harvesting genetic parts from genomes to support biological design automation. **6th International Workshop on Bio-Design Automation**. (Corresponding Author)
15. Liao C, Cai Y (2014) Towards Modeling Automation for Synthetic Biology. **A Systems Theoretic Approach to Systems and Synthetic Biology II: Analysis and Design of Cellular Systems**: Springer Netherlands. pp. 201-217. (Corresponding Author)
14. Cai Y, Ellis T (2014) The Sixth International Meeting on Synthetic Biology (SB6. 0) Special Issue Editorial. 2014 Mar 21;3(3):107. doi: 10.1021/sb500085b. **ACS Synthetic Biology**. (Corresponding Author). PMID: 24898051.
13. Annaluru N, Muller H, Mitchell LA, Ramalingam S, Stracquadanio G, et al. (2014) Total synthesis of a functional designer eukaryotic chromosome. 2014 Apr 4;344(6179):55-8. doi: 10.1126/science.1249252. **Science** 344: 55-58. PMID: 24674868.
12. Mitchell LA, Cai Y, Taylor M, Noronha AM, Chuang J, et al. (2013) Multichange Isothermal Mutagenesis: a new strategy for multiple site-directed mutations in plasmid DNA. 2013 Aug 16;2(8):473-7. doi: 10.1021/sb300131w. **ACS synthetic biology**. (co-First author). PMID: 23654272.
11. Wilson ML, Cai Y, Hanlon R, Taylor S, Chevreux B, et al. (2012) Sequence verification of synthetic DNA by assembly of sequencing reads. 2013 Jan 7;41(1):e25. doi: 10.1093/nar/gks908. **Nucleic acids research**. (co-First author). PMID: 23042248.
10. Cai Y, Boeke JD (2011) Genome remodeling. 2011 Sep 8;29(9):807-8. doi: 10.1038/nbt.1964. **Nature Biotechnology**. PMID: 21904325

9. Beal J, Phillips A, Densmore D, Cai Y (2011) High-level programming languages for biomolecular systems. **Design and analysis of biomolecular circuits**: Springer New York. pp. 225-252.
8. Cai Y, Wilson ML, Peccoud J (2010) GenoCAD for iGEM: a grammatical approach to the design of standard-compliant constructs. **Nucleic Acids Research**.
7. Czar MJ, Cai Y, Peccoud J (2009) Writing DNA with GenoCAD™. 2010 May;38(8):2637-44. doi: 10.1093/nar/gkq086. **Nucleic Acids Research**. PMID: 20167639
6. Cai Y, Lux MW, Adam L, Peccoud J (2009) Modeling structure-function relationships in synthetic DNA sequences using attribute grammars. 2009 Oct;5(10):e1000529. doi: 10.1371/journal.pcbi.1000529. **PLoS computational biology**. PMID: 19816554.
5. Peccoud J, Blauvelt MF, Cai Y, Cooper KL, Crasta O, et al. (2008) Targeted development of registries of biological parts. 2008 Jul 16;3(7):e2671. doi: 10.1371/journal.pone.0002671. **PLoS One**. PMID: 18628824.
4. French C, Nicholson J, Bizzari F, Aleksic J, Cai Y, et al. (2007) Arsenic biosensor: a step further. **BMC Systems Biology** 1: S11.
3. Cai Y, Hartnett B, Gustafsson C, Peccoud J (2007) A syntactic model to design and verify synthetic genetic constructs derived from standard biological parts. 2007 Oct 15;23(20):2760-7. **Bioinformatics**. PMID: 17804435.
2. Cai Y, Davidson B, Ma H, French C (2007) Modeling the arsenic biosensor system. **BMC Systems Biology** 1: P83.
1. Aleksic J, Bizzari F, Cai Y, Davidson B, De Mora K, et al. (2007) Development of a novel biosensor for the detection of arsenic in drinking water. **IET Synthetic Biology** 1: 87-90.

EDITORIAL AND REFEREE SERVICE

Journals Nature Chemical Biology; Nature Communications; ACS Synthetic Biology (Editorial Board); Bioinformatics; Nucleic Acids Research; PLoS ONE; Journal of Biological Engineering; Synthetic and Systems Biotechnology (Editorial Board); Microbial Biotechnology (Editorial Board)

Grants BBSRC (Committee D); EPSRC; ERC; NSF, NTU;

RESEARCH PH.D STUDENT SUPERVISION

11. **Miriam Vega Gordillo**, Jan 2021 - Current, Ph.D student in Synthetic Biology, University of Manchester, principal supervisor.
10. **James Sanders**, Jan 2021 - Current, Ph.D student in Synthetic Biology, University of Manchester, principal supervisor.
9. **Alba Ballerini**, Jan 2020 - Current, Ph.D student in Synthetic Biology, University of Manchester, principal supervisor.
8. **Joshua James**, Sep 2019 - Current, Ph.D student in Synthetic Biology, University of Manchester, principal supervisor.
7. **Marco Monti**, Jan 2019 - Current, Ph.D student in Synthetic Biology, University of Manchester, principal supervisor.
6. **Jamie Auxillos**, Jan 2016 - Feb 2020, Ph.D student in Biological Sciences, University of Edinburgh, principal supervisor. Now postdoc in the University of Edinburgh.
5. **Katarina Jonsson**, Sep 2015 - Oct 2019, Ph.D student in Biological Sciences, University of Edinburgh, second supervisor.

4. **Paulina Kanigowska**, May 2014 - May 2018, Ph.D student in Biological Sciences, University of Edinburgh, principal supervisor. Now automation engineer at Ginkgo Bioworks, Boston, USA..
3. **Chantal Yue Shen**, May 2014 - May 2018, Ph.D student in Biological Sciences, University of Edinburgh, principal supervisor. Now PI in BGI.
2. **Roy Walker**, Jul 2013 - Oct 2017 (viva passed), Ph.D student in Engineering, University of Edinburgh, principal supervisor. Now at Macquarie University Australia for a postdoc with Prof. Isak S. Pretorius.
1. **Wei Liu**, Sep 2013 - Nov 2017 (viva passed), Ph.D student in Biological Sciences, University of Edinburgh, principal supervisor. Now at LMB Cambridge for a postdoc with Prof. Philipp Holliger.

RESEARCH STAFF SUPERVISION

21. **Carmen Macias Valverde**, Jan 2020 - Current, Technician.
20. **Dr. Kewin Gombeau**, Sep 2019 - Current, Postdoc.
19. **Dr. Stefan Hoffmann**, Feb 2019 - Current, Postdoc.
18. **Dr. Yingying Li**, Apr 2018 - Current, Postdoc.
17. **Dr. Reem Swidah**, Mar 2018 - Current, Postdoc.
16. **Isaac Yisha Luo**, Aug 2018 - Nov 2020, Computational Biologist.
15. **Dr. Daniel Schindler**, Mar 2017 - Current, Postdoc. Now PI in Max Planck Institute for Terrestrial Microbiology, Marburg, Germany.
14. **Sally Jones**, Sep 2017 - Sep, 2019, Technician. Now PhD student in John Inner Centre.
13. **Dr. Eva Garcia Ruiz**, Aug 2016 - Jan 2019, Postdoc. Now PI in Institute of Catalysis and Petrochemistry, Spanish Research Council, Madrid, Spain.
12. **Aileen Greig**, Jun 2015 - Oct 2017, Technician.
11. **Dr. Dariusz Abramczk**, May 2015 - Dec 2018, Postdoc
10. **Dr. Andrea Martella**, Jan 2015 - Sep 2017, Postdoc. Now PI and senior scientist at AstraZeneca, Cambridge, UK.
9. **Aitor Bleda**, May 2016 - Nov 2016, Software Engineer.
8. **Dr. Ivan Yuan**, Nov 2015 - Nov 2016, Automation Engineer.
7. **Anais Moisy**, Nov 2015 - Nov 2016, Designer, Design Informatics.
6. **Dr. Valentin Zulkower**, Jun 2015- Nov 2016, Software Developer. Now at Ginkgo Bioworks, Boston, USA.
5. **Fraser Morton**, Apr 2015 - Aug 2015, Genome Foundry Software Manager.
4. **Dr. Hille Tekotte**, Jan 2015 - Nov 2016, Genome Foundry Manager.
3. **Isaac Yisha Luo**, Mar 2014 - Nov 2016, Software Developer.
2. **Sarah Yijing Zheng**, Oct 2014 - Nov 2016, Automation Engineer.
1. **Alba Ubide**, Oct 2013 - Sep, 2016, Lab manager.

OTHER SUPERVISION

27. **Elisa Barrow Molina**, Oct 2020 - Current, Master of Biological Sciences, University of Manchester

26. **David Leeming**, Oct 2020 - Current, Master of Chemistry, University of Manchester
25. **Milly Olifent**, Oct 2020 - Current, Master of Chemistry, University of Manchester
24. **Adam Jedrzejewski**, Oct 2020 - Current, undergraduate of biological sciences, University of Manchester
23. **Yizhao Yang**, Apr 2020 - Sep 2020, Master of Chemistry, University of Manchester
22. **Alex Atkinson**, Oct 2019 - Apr 2019, Master of Chemistry, University of Manchester
21. **Dylan Kelly**, Oct 2019 - Apr 2019, Master of Chemistry, University of Manchester
20. **Prof. Shijian Liu**, Sep 2018 - Aug 2019, Visiting scholar funded by Chinese Scholarship Council, Fujian University of Technology
19. **Alba Ballerini**, Jan 2019 - Apr 2020, Erasmus+ Master student, University of Pisa
18. **Francesco Ragazzini**, Jan 2019 - Nov 2019, Erasmus+ Master student, University of Pisa
17. **Ivy Zhang**, Jun 2019 - Aug 2019, DREAM program undergrad student, Chinese University of Hong Kong
16. **Jun Yang Ong**, Oct 2018 - May 2019, Master of Chemistry, University of Manchester
15. **Yun Wang**, Mar 2018 - Jun 2018, BBSRC Rutherford Fellow, BGI
14. **Dr. Shuangying Li**, Mar 2018 - Current, BBSRC Rutherford Fellow, Chinese Academy of Sciences. Now associate professor at Shenzhen Institute of Advanced Technology, China.
13. **Tao Lin**, Oct 2017 - Feb 2018, Visiting Scientist, BGI
12. **Macro Monti**, Nov 2018 - Current, visiting Master student in Molecular Biology from the University of Bologna.
11. **Franklin Lo**, Apr - Jul 2017, Undergraduate Research Student, University of Edinburgh
10. **Yifan Wu**, Oct 2016- Current, Undergraduate Honours Student, University of Edinburgh
9. **Fabian Schneider**, Mar - Sep, 2016, Visiting PhD student, University of Munich
8. **Jamie Auxillos**, Sep 2014 - Dec, 2015, Master student in Synthetic Biology, University of Edinburgh
7. **Tianyi Li**, Jul 2015 - Aug 2015, Visiting graduate student, Tsinghua University
6. **Lois Ogunlana**, Jun 2015 - Aug 2015, Undergraduate student in Biotechnology, University of Edinburgh
5. **Claire Chung**, Jun 2014 - Aug 2014, Visiting undergraduate from Chinese University of Hong Kong
4. **Emily Scher**, Sep 2013 - Aug 2014, Visiting undergraduate from Johns Hopkins University
3. **Hugo Vilanueva**, Sep 2013 - Sep 2014, Honors undergraduate student in Biological Sciences, University of Edinburgh
2. **Jackie Yun Wang**, Apr 2013 - Jun 2014, Visiting scholar from BGI
1. **Qi Feng**, Apr 2014 - Aug 2014, Visiting master student from Tianjin University

PATENTS

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- Cai Y, Agmon A, and Boeke J. Compositions and methods for controlling microbial growth. US Patent App. 2015.
 - Mitchell L, Cai Y and Boeke J. Versatile genetic assembly system (vegas) and its use in assembling pathways for expression in *S. cerevisiae*. US Patent App. 2015.

- Peccoud J, Cai Y (2008) Software for Design and Verification of Synthetic Genetic Constructs. US Patent App. 12/058,712.

SELECTED AWARDS

- **Apr 2018** Visiting Professorship, Hong Kong University (3 appointees globally across all disciplines)
- **Mar 2018** Associate Faculty in Synthetic Genomics, Wellcome Trust Sanger Institute (3 appointees globally)
- **Nov 2016** Raising Star in Science, ICG11
- **Aug 2015** Wellcome Trust Frontier Innovator (9 awardees worldwide)
- **Aug 2012** Chancellor's Fellowship, University of Edinburgh, UK
- **Sep 2011** Autodesk Distinguished Scholarship, Autodesk Inc.
- **Jun 2011** Traveling Fellowship, The Fifth International Conference for Synthetic Biology (SB5.0), Stanford University, USA
- **May 2011** The DeLill Nasser Award for Progressional Development, The Genetic Society of America
- **Mar 2010** Outstanding Interdisciplinary Doctoral Student of the Year (1 student per year), Virginia Tech, USA

INVITED PRESENTATIONS

101. JAN 2020 Presentation at EMBO symposium on "Engineering Meets Evolution: Designing biological systems", Chennai, India.
100. NOV 2019 Presentation at International Conference on Metabolic Sciences, Shanghai, China.
99. NOV 2019 Keynote at CBRE Annual Meeting, Liverpool, UK.
98. OCT 2019 Presentation at Cold Spring Harbor Asia Meeting for Synthetic Biology, Suzhou, China.
97. OCT 2019 Presentation at China GP-W meeting, Shenzhen, China.
96. SEP 2019 Presentation at The 91st Annual Meeting of the Genetic Society of JAPAN, Fukui, Japan.
95. AUG 2019 Presentation at the Chinese Young Synthetic Biologist Forum, Tianjin, China.
94. JUL 2019 Centre Seminar at Philipps-Universität Marburg, Marburg, Germany.
93. JUN 2019 Presentation at the 47th Korean Society for Microbiology and Biotechnology (KMB) meeting, Jeju island, South Korea.
92. MAR 2019 Pregl Colloquium Lecture, the National Institute of Chemistry, Ljubljana, Slovenia
91. MAR 2019 Cold Spring Harbor Banbury Centre meeting on DNA storage, New York, USA
90. FEB 2019 Keynote Lecture at Hong Kong Area of Excellence Symposium, Hong Kong, China
89. DEC 2018 Keynote Lecture at the SBMS Research day at the University of Hong Kong, Hong Kong, China
88. OCT 2018 Departmental seminar at the "Microbes and Booze" event, VIB, KU Leuven, Belgium

87. OCT 2018 Departmental seminar at Institut de Biochimie et Génétique Cellulaires, Bordeaux University, France
86. JUL 2018 Lectures at the 5th International Synthetic & Systems Biology Summer School (SSBSS2018), Siena, Italy.
85. JUL 2018 Seminar at Chinese Academy of Science Bioenergy Institute, Qingdao, China.
84. JUN 2018 Presentation at the 46th Korean Society for Microbiology and Biotechnology (KMB) meeting, Yeosu, South Korea.
83. APR 2018 Seminar at Astra Zeneca, Cambridge, UK.
82. MARCH 2018 Seminar at Newcastle University synthetic biology research centre, Newcastle, UK.
81. MARCH 2018 Keynote at The Manchester Molecular and Genome Evolution symposium, Manchester, UK.
80. OCT 2017 The 12th International conference for Genomics, ICG 12, Shenzhen, China.
79. OCT 2017 BBSRC NPRONET Community Meeting, Manchester, UK.
78. JUN 2017 The 7th International conference on synthetic biology (SB7.0), Singapore.
77. MAY 2017 Bristol Centre for Synthetic Biology, Bristol, UK.
76. MAY 2017 International workshop on Genome Project Write (GP-Write), New York Genome Centre, New York, USA.
75. MAY 2017 Seminar at VIB Center for Microbiology, University of Leuven, Belgium.
74. MAY 2017 Seminar at LOEWE-Schwerpunkt CompuGene, Technische Universität Darmstadt, Germany.
73. MAY 2017 Keynote at DECHEMA “ Systems Biology meets Synthetic Biology Programme” conference, Frankfurt, Germany.
72. MAR 2017 Sanger Institute workshop on synthetic biology, Hinxton, UK.
71. MAR 2017 BBSRC funded Global Challenge Research Fund workshop with China (PI and host), Edinburgh, UK.
70. MAR 2017 the 7th UK-Korea symposium on synthetic biology, Yongsei University, Seoul, Korea.
69. FEB 2017 Institute of Integrative Biology, University of Liverpool, Liverpool, UK.
68. JAN 2017 European Bioinformatics Institute, Hinxton, UK.
67. DEC 2016 US Navy Research Global Head Quarter Seminar, London, UK.
66. DEC 2016 Manchester Institute of Biotechnology Seminar, Manchester, UK.
65. DEC 2016 IET Synthetic Biology Meeting, London, UK.
64. DEC 2016 Cold Spring Harbor Asia Meeting for Synthetic Biology, Suzhou, China.
63. Nov 2016 UK-China Synthetic Biology for Global Challenges Symposium, Shenzhen, China.
62. Nov 2016 The 11th International Conference on Genomics (ICG11), Shenzhen, China.
61. SEP 2016 Labcyte-Edinburgh Genomics Symposium , Edinburgh, UK.
60. SEP 2016 The Seventh International Workshop on Static Analysis and Systems Biology (SASB 2016) Keynote, Edinburgh, UK.

59. AUG 2016 Royal Society President Dinner for Synthetic Biology Inquiry (6 invitees), London, UK.
58. JUL 2016 Annual UCL Synthetic Biology Showcase Keynote, London, UK.
57. JUL 2016 The 5th International Synthetic Yeast meeting, Edinburgh, UK.
56. JUL 2016 Edinburgh Genome Foundry Opening, Edinburgh, UK.
55. JUN 2016 UCB Annual Retreat Keynote, Windsor, UK.
54. MAY 2016 Human Genome Write Project Meeting, Harvard University, Boston, USA.
53. MAY 2016 Wellcome Trust Centre Renewal Presentation, Edinburgh, UK.
52. APR 2016 Departmental seminar in the Institute of Systems Biology, University of Chicago, Chicago, USA.
51. MAR 2016 Gates Foundation Project Meeting, Montreal, Canada.
50. FEB 2016 Automation for Synthetic Biology, Manchester, UK.
49. DEC 2015 Royal Society Edinburgh - China Academy of Sciences joint symposium on Synthetic Biology, Edinburgh, UK.
48. NOV 2015 Raymond and Beverly Sackler USA-UK Scientific Forum: Trends in Synthetic Biology and Gain of Function Research, and Regulatory Implications, Chicheley, UK
47. NOV 2015 University of Edinburgh King's Building Campus wide Seminar (Academics Unplugged, 1 of 3 elected faculty members for 2015), Edinburgh, UK
46. OCT 2015 Human Genome Project 2.0 Meeting, New York, USA
45. OCT 2015 The 10th Annual International Conference for Genomics (ICG10), Shenzhen, China
44. OCT 2015 Seminar at Synthetic Biology Research Centre at Warwick University, Coventry, UK
43. OCT 2015 Seminar at Thermo Fisher, Regensburg, Germany
42. SEP 2015 Wellcome Trust Sciences at the Interface meeting, London, UK
41. SEP 2015 UK-USA DNA Foundry meeting, London, UK
40. SEP 2015 UK Synthetic Biology Conference, London, UK
39. AUG 2015 Company Seminar, Autodesk Inc, San Francisco, USA
38. AUG 2015 Company Seminar, Labcyte Inc, Sunnyvale, USA
37. AUG 2015 Departmental Seminar, Department of Chemical and Biomolecular Engineering, University of Illinois at Urbana-Champaign, USA
36. JUL 2015 The 4th International Synthetic Yeast Consortium Meeting. New York Genome Centre, New York, USA
35. JUL 2015 High Value Chemicals from Plants workshop. John Inners Centre, Norwich, UK
34. MAY 2015 Chinese Young Synthetic Biologist Forum, Tsinghua University, Beijing, China
33. APR 2015 BBSRC Synthetic Biology for Growth workshop, Birmingham, UK
32. MAR 2015 Agilent Headquarter, Santa Clara, California, USA
31. NOV 2014 UK-Canada workshop on Synthetic Biology, Montreal, Canada
30. OCT 2014 Synthetic Biology Congress, London, UK

29. OCT 2014 The Genome Analysis Centre (TGAC), Norwich, UK
28. SEP 2014 National Institute of Genetics, Mishima, Japan
27. SEP 2014 The 9th International Conference on Genomics (ICG9), Shenzhen, China
26. AUG 2014 EMBO Synthetic Biology of Antibiotic Production II Conference, Sant Feliu de Guixols, Spain
25. JUL 2014 XIVth International Union of Microbiological Societies, Montreal, Canada
24. JUL 2014 Fab10 Barcelona Conference, Barcelona, Spain
23. JUN 2014 The 3rd International Synthetic Yeast consortium meeting, Sicily, Italy
22. APR 2014 Outlook for Synthetic Biology meeting, Manchester, UK
21. APR 2014 Departmental seminar at the School of Life Sciences, Nottingham, UK
20. FEB 2014 Korea Advanced Institute for Sciences and Technology, Seoul, South Korea
19. JAN 2014 Departmental Seminar, National University of Singapore, Singapore
18. NOV 2013 Life Technologies GeneArt Headquarter, Regensburg, Germany
17. JUL 2013 SB6.0 Conference, London, UK
16. OCT 2012 Plenary Speaker, the BIO Pacific Rim Summit on Industrial Biotechnology and Bioenergy, Vancouver, Canada.
15. SEP 2012 IDEASstudio Meeting, Autodesk, San Francisco, USA
14. APR 2012 Synthetic Biology Centre, Imperial College London, London, UK
13. APR 2012 Institute for Systems Biology and Synthetic Biology, University of Edinburgh, UK
12. APR 2012 First International Synthetic Yeast Genome Consortium Meeting, Beijing, China
11. MAR 2012 IDEAS: The Innovation + Design Series, San Francisco, USA
10. NOV 2011 Session Chair, The 7th International Conference on Genomics, Shenzhen, China
9. NOV 2011 Cold Spring Harbor Symposium: Design & Synthesis of Biological Systems, Suzhou, China
8. NOV 2011 Departmental Seminar, Chinese University of Hong Kong, Hong Kong
7. OCT 2011 Six-academy Synthetic Biology Symposium, The enabling technology of synthetic biology, Shanghai, China
6. JUN 2011 Departmental Seminar, Hong Kong University of Science and Technology, Hong Kong
5. OCT 2010 What are the potential roles for Synthetic Biology in NASA's mission? NASA Ames Research Centre, California, USA
4. OCT 2010 Panel discussion, Synthetic Biology: Applications and Implications, Mid-Atlantic Bio Conferences, Bethesda, Maryland, USA
3. APR 2010 Seminar, High Throughput Biology Centre, School of Medicine, Johns Hopkins University
2. MAR 2010 Departmental Seminar, M.D. Anderson Cancer Research Center, Houston, USA
1. NOV 2009 Departmental Seminar, Artificial Intelligence, University of California at San Diego (UCSD)