BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Jingyue Ju	**Professor of Chemical Engineering and Pharmacology, Director, Center for Genome Technology and Biomolecular Engineering, Columbia University**

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of California at Berkeley	Postdoctoral	1994-95	Genomics Research
University of Southern California	Ph.D.	1994	Bioorganic Chemistry
Institute of Chemical Physics, Chinese Academy of Sciences	M.S.	1988	Organic Chemistry
Inner Mongolia University, P. R. China	B.S	1985	Chemistry

PROFESSIONAL POSITIONS

2011- Present Samuel Ruben-Peter G. Viele Professor of Engineering, Columbia University
2010- Present Professor of Chemical Engineering and Pharmacology, Columbia University
2003-Present Director, Center for Genome Technology and Biomolecular Engineering, Columbia University
2009-Present Research Director of the Steering Committee, Tsinghua Center for Advanced Genomic Research with Columbia University, Tsinghua University
2005-Present Professor of Chemical Engineering and Head of DNA Sequencing and Chemical Biology, Columbia Genome Center, Columbia University
1999-2005 Associate Professor of Chemical Engineering and Head of DNA Sequencing and Chemical Biology, Columbia Genome Center, Columbia University
1995-1999 Senior Scientist & Director, Chemistry & Assay Development, Incyte Genomics, Inc.

AWARDS

Distinguished Fundamental Research Award for Next Generation DNA Sequencing Research & Development. Next Generation Sequencing (NGS) Research and Development Association, China, 2017.
Samuel Ruben-Peter G. Viele Professor of Engineering, 2011.
Outstanding Chinese Scholar Achievement Award, Columbia University Chinese Students and Scholars Association, 2004.
Visiting Professor of Beijing Capital University of Medical Sciences, 2004.
Packard Fellowship in Science and Engineering, 2001-2006.
Invited Attendee, National Academy of Engineering *8th Annual Frontiers of Engineering Symposium*, September, 2002.
DOE Human Genome Distinguished Postdoctoral Fellowship, 1994-1995.
U.S. Biochemical Postdoctoral Fellowship, 1993.

PROFESSIONAL ACTIVITIES

Session Chair, *Next Generation Sequencing Conference*, July 7-8, 2011, San Francisco.
Organizer and Chair, 2008 International Conference on Genomics, Hong Kong, China, 11/2-11/5, 2008.
Organizer and Chair, 2007 International Conference on Genomics, Hong Kong, China, 10/30-11/2, 2007.
NIH Review Panel (*Genomics Computational Biology and Technology Study Section*) 2005, 2006
Session Chair, "*Symposium on New DNA Sequencing Technologies*", International Conference on Genomics, Hangzhou, China, October 23-24, 2006.
Organizer and Chair, "*New Technologies & Genome Sequencing*" BioArrays-2004-New York Conference, July 26-27, 2004.

Organizer and Chair, "*New Technology and ToxicoGenomics*" BioArrays-2003-New York Conference, October 1-2, 2003.
Organizer and Chair, Symposium on Genomics and Chemical Biology, Post 15th International Conference on Phosphorus Chemistry, Beijing, China, August 6-8, 2001.
Chair, DNA Sequencing Technology Session, Human Genome Meeting, Human Genome Organization (HUGO), 1997.
NIH Review Panel (*Genetic and Genomic Approaches to Nervous System Function and Dysfunction*) 2004
NIH Review Panel (*Biophysical and Chemical Sciences*) SBIR/STTR 1997-2001
NSF Review Panel (*Biochemical Engineering and Biotechnology*) 2001
DOE Human Genome Program Review Panel (*Advanced DNA Sequencing Technology*) 1998
Reviewer for the Journal *Proceedings of the National Academy of Sciences, Nature Materials, Nucleic Acids Research, Analytical Chemistry, JACS, Organic Letters, Bioconjugate Chemistry* and *Biotechniques*.

ISSUED US PATENTS

1. United States Patent 9,868,985 (2018) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
2. United States Patent 9,909,177 (2018) J. Ju, J. Wu and D.H. Kim "*Pyrosequencing Methods and Related Compositions*".
3. United States Patent 9,890,426 (2018) J. Ju, Z. Li, S. Kalachikov and C. Fuller "*Pore-Forming Protein Conjugate Compositions and Methods*".
4. United States Patent 9,738,922 (2017) T.H. Bestor, J.R. Edwards, J. Ju and X. Li "*Universal Methylation Profiling Methods*".
5. United States Patent 9,725,480 (2017) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
6. United States Patent 9,719,139 (2017) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
7. United States Patent 9,718,852 (2017) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
8. United States Patent 9,708,358 (2017) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
9. United States Patent 9,670,539 (2017) J. Ju, H. Cao, Z. Li, Q. Meng, J. Guo, S. Zhang, Y. Lin "*Synthesis of Cleavable Fluorescent Nucleotides as Reversible Terminators for DNA Sequencing by Synthesis*".
10. United States Patent 9,624,539 (2017) J. Ju, J. Wu, Z. Li. "*DNA Sequencing by Synthesis Using Raman and Infrared Spectroscopy Detection*".
11. United States Patent 9,528,151 (2016) J. Ju, D.H. Kim, L. Bi, Q. Meng, X. Li. "*Four-color DNA Sequencing by Synthesis Using Cleavable Fluorescent Nucleotide Reversible Terminators*".
12. United States Patent 9,297,042 (2016) J. Ju, L. Bi, D.H. Kim, Q. Meng. "*Chemically Cleavable 3'-O-Allyl-dNTP-Allyl-Fluorophore Fluorescent Nucleotide Analogues and Related Methods*".
13. United States Patent 9,255,292 (2016) J. Ju, Q. Meng, D.H. Kim, L. Bi, X. Bai, N. Turro. "*Synthesis of Four-color 3'-O-allyl Modified Photocleavable Fluorescent Nucleotides and Related Methods*".
14. United States Patent 9,250,169 (2016) J. Ju, D.W. Landry, Q. Lin, T. Nguyen, R. Pei, C. Oiu, M.N. Stojanovic "*Selective Capture and Release of Analytes*".
15. United States Patent 9,175,342 (2015) J. Ju, H. Cao, Z. Li, Q. Meng, J. Guo, S. Zhang "*Synthesis of Cleavable Fluorescent Nucleotides as Reversible Terminators for DNA Sequencing by Synthesis*".
16. United States Patent 9,169,510 (2015) J. Ju, J. Wu, D.H. Kim "*Pyrosequencing Methods and Related Compositions*".
17. United States Patent 9,133,511 (2015) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".

18. United States Patent 9,115,163 (2015) J. Ju, D.H. Kim, J. Guo, Q. Meng, Z. Li, H. Cao "*DNA Sequencing with Non-fluorescent Nucleotide Reversible Terminators and Cleavable Label Modified Nucleotide Terminators*".
19. United States Patent 8,889,348 (2014) J. Ju "*DNA Sequencing by Nanopore Using Modified Nucleotides*".
20. United States Patent 8,796,432 (2014) J. Ju, L. Bi, D.H. Kim, Q. Meng "*Chemically Cleavable 3'-O-Allyl-dNTP-Allyl-Fluorophore Fluorescent Nucleotide Analogues and Related Methods*".
21. United States Patent 8,298,792 (2012) J. Ju, D.H. Kim, L. Bi, Q. Meng and X. Li "*Four-Color DNA Sequencing By Synthesis Using Cleavable Fluorescent Nucleotide Reversible Terminators*".
22. United States Patent 8,088,575 (2012) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
23. United States Patent 7,982,029 (2011) J. Ju, Q. Meng, D.H. Kim, L. Bi, X. Bai and N.J. Turro "*Synthesis of Four Color 3'O-allyl, Modified Photocleavable Fluorescent Nucleotides and Related Methods*".
24. United States Patent 7,883,869 (2011) J. Ju, D.H. Kim, L. Bi, Q. Meng and X. Li "*Four-Color DNA Sequencing By Synthesis Using Cleavable Fluorescent Nucleotide Reversible Terminators*".
25. United States Patent 7,790,869 (2010) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
26. United States Patent 7,713,698 (2010) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
27. United States Patent 7,635,578 (2009) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
28. United States Patent 7,622,279 (2009) J. Ju, "*Photocleavable Fluorescent Nucleotides for DNA Sequencing on Chip Constructed by Site-Specific Coupling Chemistry*".
29. United States Patent 7,345,159 (2008) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
30. United States Patent 7,074,597 (2006) J. Ju *"Multiplex Genotyping Using Solid Phase Capturable Dideoxynucleotides and Mass Spectrometry*".
31. United States Patent 7,015,000 (2006) R.A. Mathies, A.N. Glazer and J. Ju *"Probes Labeled with Energy Transfer Coupled Dyes*".
32. United States Patent 6,664,079 (2003) J. Ju, Z. Li, J.R. Edwards and Y. Itagaki "*Massive Parallel Method for Decoding DNA and RNA*".
33. United States Patent 6,627,748 (2003) J. Ju, Z. Li, A. Tong and J. Russo "*Combinatorial Fluorescence Energy Transfer Tags and their Applications for Multiplex Genetic Analyses*".
34. United States Patent 6,544,744 (2003) R.A. Mathies, A.N. Glazer and J. Ju *"Probes Labeled with Energy Transfer Coupled Dyes*".
35. United States Patent 6,177,247 (2001) R.A. Mathies, A.N. Glazer and J. Ju "*Detection Methods Using Probes Labeled with Energy Transfer Coupled Dyes for DNA Fragment Analysis*".
36. United States Patent 6,046,005 (2000) J. Ju, K, Konrad. "*Nucleic Acid Sequencing with Solid Phase Capturable Terminators Comprising a Cleavable Linking Group*".
37. United States Patent 6,150,107 (2000) A.N. Glazer, R.A. Mathies, S-C. Hung, and J. Ju "*Methods of Sequencing and Detection Using Energy Transfer Labels with Cyanine Dyes as Donor Chromophores*".
38. United States Patent 6,028,190 (2000) R.A. Mathies, A.N. Glazer and J. Ju "*Probes Labeled with Energy Transfer Coupled Dyes*".
39. United States Patent 5,876,936 (1999) J. Ju "*Nucleic Acid Sequencing with Solid Phase Capturable Terminators*".
40. United States Patent 5,952,180 (1999) J. Ju "*Sets of Energy Transfer Fluorescent Tags and Their Use in Multi-Component Analysis* ".
41. United States Patent 5,869,255 (1999) R.A. Mathies, A.N. Glazer and J. Ju "*Probes Labeled With Energy Transfer Coupled Dyes Exemplified with DNA Fragment Analysis*".
42. United States Patent 5,804,386 (1998) J. Ju "*Sets of Energy Transfer Fluorescent Tags and Their Use in Multi-Component Analysis* ".

43. United States Patent 5,707,804 (1998) R.A. Mathies, A.N. Glazer and J. Ju "*Primers Labeled with Energy Transfer Coupled Dyes for DNA Sequencing*".
44. United States Patent 5,728,528 (1998) R.A. Mathies, A.N. Glazer and J. Ju "*Universal Spacer/Energy Transfer Dyes*".
45. United States Patent 5,853,992 (1998) A.N. Glazer, S-C. Hung, R.A. Mathies, and J. Ju "*Cyanine Dyes with High Absorption Cross Section as Donor Chromophores in Energy Transfer Primers*".
46. United States Patent 5,814,454 (1998) J. Ju "*Sets of Energy Transfer Fluorescent Tags and Their Use in Multi-Component Analysis* ".
47. United States Patent 5,654,419 (1997) R.A. Mathies, A.N. Glazer and J. Ju "*Fluorescent Labels and Their Use in Separations*".
48. United States Patent 5,688,648 (1997) R.A. Mathies, A.N. Glazer and J. Ju "*Probes Labeled with Energy Transfer Coupled Dyes*".

PATENT APPLICATIONS

1. "*Ion Sensor DNA and RNA Sequencing by Synthesis Using Nucleotide Reversible Terminators*". J. Ju, J.J. Russo, L. Yu. *United States Patent Application 20170101675* (Publication date: April 13, 2017).
2. "*DNA Sequencing by Nanopore Using Modified Nucleotides*". J. Ju. *United States Patent Application 20170096704* (Publication date: April 6, 2017).
3. "*Massive Parallel Method for Decoding DNA and RNA*". J. Ju, Z. Li, J.R. Edwards and Y. Itagaki. *United States Patent Application 20170088891* (Publication date: March 30, 2017).
4. "*Single Molecule Electronic Multiplex SNP Assay and PCR Analysis*". C. Tao, S. Kumar, M. Chien, J. Ju. *United States Patent Application 20170058335* (Publication date: March 2, 2017).
5. "*Chemically Cleavable 3'-O-Allyl-dNTP-Allyl-Fluorophore Fluorescent Nucleotide Analogues and Related Methods*". J. Ju, L. Bi, D.H. Kim, Q. Meng. *United States Patent Application 20170051346* (Publication date: February 23, 2017).
6. "*Universal Methylation Profiling Methods*". T. Bestor, J. Ju, X. Li, J. J. Russo. *United States Patent Application 20160355542* (Publication date: December 8, 2016).
7. "*Pyrosequencing Methods and Related Compositions*". J. Ju, J. Wu, D. H. Kim. *United States Patent Application 20160312279* (Publication date: October 27, 2016).
8. "*Massive Parallel Method for Decoding DNA and RNA*". J. Ju, Z. Li, J.R. Edwards and Y. Itagaki. *United States Patent Application 20160264612* (Publication date: September 15, 2016).
9. "*Synthesis of Four-Color 3'-O-Allyl Modified Photocleavable Fluorescent Nucleotides and Related Methods*". J. Ju, Q. Meng, D.H. Kim, L. Bi, X. Bai, N. J. Turro. *United States Patent Application 20160208313* (Publication date: July 21, 2016).
10. "*Selective Capture and Release Of Analytes*". J. Ju, D.W. Landry, Q. Lin, T. Nguyen R. Pei, C. Qiu, M.N. Stojanovic. *United States Patent Application 20160169780* (Publication date: June 16, 2016).
11. *"Design and Synthesis of Novel Disulfide Linker Based Nucleotides as Reversible Terminators for DNA Sequencing by Synthesis"*." J. Ju, X. Li, X. Chen, Z. Li, S. Kumar, S. Shi, C. Guo, J. Ren, M. Hsieh, M. Chien, C. Tao, E. Erturk, S. Kalachikov, J. J. Russo. *International Application Published Under the Patent Cooperation Treaty, WO 2017/058953* (International Publication Date: April 6, 2017).
12. "*Design and Synthesis of Cleavable Fluorescent Nucleotides as Reversible Terminators for DNA Sequencing by Synthesis*". J. Ju, H. Cao, Z. Li, Q. Meng, J. Guo, S. Zhang, L. Yu. *United States Patent Application 20160090621* (Publication date: March 31, 2016).
13. "*Method for Detecting Multiple Predetermined Compounds in a Sample*". J. Ju, S. Kumar, C. Tao, S. Kalachikov, J. J. Russo. *United States Patent Application 20160041179* (Publication date: February 11, 2016).
14. "*DNA Sequencing with Non-Fluorescent Nucleotide Reversible Terminators and Cleavable Label Modified Nucleotide Terminators*". J. Ju, D.H. Kim, J. Guo, Q. Meng, Z. Li, H. Cao. *United States Patent Application 20160024574* (Publication date: January 28, 2016)
15. "*Raman Cluster Tagged Molecules for Biological Imaging*". J. Ju, S. Kumar, M. Palla, J. J. Russo. *United States Patent Application 20160024570* (Publication date: January 28, 2016).

16. "*Chemical Methods for Producing Tagged Nucleotides*". C. W. Fuller, S. Kumar, J. Ju, R. Davis, R. Chen. *United States Patent Application 20150368710* (Publication date: December 24, 2015).
17. "*Massive Parallel Method for Decoding DNA and RNA*". J. Ju, Z. Li, J.R. Edwards and Y. Itagaki. *United States Patent Application 20150197800* (Publication date: July 16, 2015).
18. "*Universal Methylation Profiling Methods*". T. H. Bestor, J. R. Edwards, J. Ju, X. Li. *United States Patent Application 20150148240* (Publication date: May 28, 2015).
19. "*Single Molecule Electronic Multiplex SNP Assay and PCR Analysis*". C. Tao, S. Kumar, M. Chien, J. Ju. *PCT International Patent Application* (Filing date: February 12, 2015).
20. "*Nucleic Acid Sequencing by Nanopore Detection of Tag Molecules*". J. Ju, R. Davis, R. Chen. *United States Patent Application 20150119259* (Publication date: April 30, 2015).
21. "*DNA Sequencing by Synthesis Using Raman and Infrared Spectroscopy Detection*". J. Ju, J. Wu, Z. Li. *United States Patent Application 20150080232* (Publication date: March 19, 2015).
22. "*Method of Preparation of Nanopore and Uses Thereof*". J. Ju, S. Kumar, C. Tao, M. Chien, J. J. Russo, J. J. Kasianowicz, J. W. F. Robertson. *United States Patent Application 20150111759* (Publication date: April 23, 2015).
23. "*DNA Sequencing by Nanopore Using Modified Nucleotides*". J. Ju. *United States Patent Application 20150037788* (Publication date: February 5, 2015).
24. "*Chemically Cleavable 3'-O-Allyl-dNTP-Allyl-Fluorophore Fluorescent Nucleotide Analogues and Related Methods*". J. Ju, L. Bi, D.H. Kim, Q. Meng. *United States Patent Application 20140377743* (Publication date: December 25, 2014).
25. "*Four-Color DNA Sequencing By Synthesis Using Cleavable Fluorescent Nucleotide Reversible Terminators*". J. Ju, D.H. Kim, L. Bi, Q. Meng, X. Li. *United States Patent Application 20140315191* (Publication date: October 23, 2014).
26. "*Massive Parallel Method for Decoding DNA and RNA*". J. Ju, Z. Li, J.R. Edwards, Y. Itagaki. *United States Patent Application 20140206553* (Publication date: July 24, 2014).
27. "*Design and Synthesis of Cleavable Fluorescent Nucleotides as Reversible Terminators for DNA Sequencing by Synthesis*". J. Ju, H. Cao, Z. Li, Q. Meng, J. Guo, S. Zhang. *United States Patent Application 20140093869* (Publication date: April 3, 2014).
28. "*Selective Capture and Release of Analytes*". J. Ju, D.W. Landry, Q. Lin, T. Nguyen, R. Pei, C. Oiu, M.N. Stojanovic. *United States Patent Application 20140038301* (Publication date: February 6, 2014).
29. "*Design and Synthesis of Novel Disulfide Linker Based Nucleotides as Reversible Trerminatirs for DNA Sequencing by Synthesis*". J. Ju, X. Li, Z. Li, S. Kumar, X. Chen, C. Guo, S. Shi, J. Ren, C. Tao, M. Chien. *Provisional Patent Application Number 62/257,102* (Filing date: November 19, 2015).
30. "*Pore-Forming Protein Conjugate Compositions and Methods*". J. Ju, Z. Li, S. Kalachikov, C. Fuller. Patent Application: *U.S. Serial No. 15/064,555,* (Filing date: March 8, 2016).
31. "*Polymer Tagged Nucleotides for Single Molecule Electronic SNP Assay*". J. Ju, Y. Cho, S. Kumar, S. Kalachikov, C. Tao, M. Chien, J. J. Russo. *PCT Patent Application US2016/023607* (Filing date: March 22, 2016).
32. *"3'-O-Modified Nucleotide Analogues with Different Cleavable Linkers for Attaching Fluorescent Labels to the Base for DNA Sequencing by Synthesis*". J. Ju, X. Li, X. Chen, S. Kumar, J. Russo, M. Chien. *United States Provisional Patent Application* (Filed on March 28, 2017; Application Number 89495-PRO/JPW/GJG/RBR).

PUBLICATIONS

1. "*Saturation Mutagenesis Reveals Manifold Determinants of Exon Definition*". S. Ke, V. Anquetil, J. Rojas-Zamalloa, A. Maity, A. Yang, M. A. Arias, S. M. Kalachikov, J. Russo, J. Ju, and L. A. Chasin. *Genome Research*. 2018, **28**, 11-24.
2. "*Real-Time Single-Molecule Electronic DNA Sequencing by Synthesis Using Polymer-Tagged Nucleotides on a Nanopore Array*". C. W. Fuller, S. Kumar, M. Porel, M. Chien, A. Bibillo, P. B. Stranges, M. Dorwart, C. Tao, Z. Li, W. Guo, S. Shi, D. Korenblum, A. Trans, A. Aguirre, E. Liu, E. Harada, J. Pollard, A. Bhat, C. Cech, A. Yang, C. Arnold, M. Palla, J. S. Hovis, R. Chen,

I. Morozova, S. Kalachikov, J. J. Russo, J. Kasianowicz, R. Davis, S. Roever, G. M. Church, and J. Ju. *Proceedings of the National Academy of Sciences USA*. 2016, **113,** E6749–E6756.

3. "*Real-Time Single-Molecule Electronic DNA Sequencing by Synthesis Using Polymer-Tagged Nucleotides on a Nanopore Array*". C. W. Fuller, S. Kumar, M. Porel, M. Chien, A. Bibillo, P. B. Stranges, M. Dorwart, C. Tao, Z. Li, W. Guo, S. Shi, D. Korenblum, A. Trans, A. Aguirre, E. Liu, E. Harada, J. Pollard, A. Bhat, C. Cech, A. Yang, C. Arnold, M. Palla, J. S. Hovis, R. Chen, I. Morozova, S. Kalachikov, J. J. Russo, J. Kasianowicz, R. Davis, S. Roever, G. M. Church, and J. Ju. *Proceedings of the National Academy of Sciences USA*. 2016, **113**, 5233-5238.
4. "*Mathematical Model for Biomolecular Quantification Using Large-Area Surface-Enhanced Raman Spectroscopy Mapping*". F. Bosco, J. Yang, T. Rindzevicius, T.S. Alstrøm, M.S. Schmidt, Q. Lin, J. Ju, A. Boisen. *Royal Society of Chemistry Advances*, 2015, **5**, 85845-85853.
5. "*DNA Sequencing by Synthesis Using 3'-O-azidomethyl Nucleotide Reversible Terminators and Surface-Enhanced Raman Spectroscopic Detection*". M. Palla, W. Guo, S. Shi, Z. Li, J. Wu, S. Jockusch, C. Guo, J.J. Russo, N.J. Turro and J. Ju. *Royal Society of Chemistry Advances*, 2014, **4**, 49342-49346.
6. "*A Microfluidic Device for Multiplex Single-Nucleotide Polymorphism Genotyping*". J. Zhu, C. Qiu, M. Palla, T. Nguyen, J.J. Russo, J. Ju, Q. Lin. *Royal Society of Chemistry Advances*, 2014, **4**, 4269-4277.
7. "*A Strategy to Capture and Characterize the Synaptic Transcriptome*". S.V. Puthanveettil, I. Antonov, S. Kalachikov, P. Rajasethupathy, Y.B. Choi, A.B. Kohn, M. Citarella, F. Yu, K.A. Karl, M. Kinet, I. Morozova, J.J. Russo, J. Ju, L.L. Moroz, E.R. Kandel. *Proceedings of the National Academy of Sciences USA*. 2013, 110, 7464-7469.
8. "*Surface-Enhanced Raman Spectroscopy Based Quantitative Bioassay on Aptamer-Functionalized Nanopillars Using Large-Area Raman Mapping*". J. Yang, M. Palla, F. Bosco, M. Schmidt, T. Rindzevicius, T. Alstrøm, A. Boisen, J. Ju, Q. Lin. *ACS Nano*, 2013, **7**, 5350-5359.
9. "*Mechanism of Flexibility Control for ATP Access of Hepatitis C Virus NS3 Helicase*". M. Palla, C.P. Chen, Y. Zhang, J. Li, J. Ju , J.C. Liao. *J. Biomol. Struct. Dyn*. 2013, **31**, 129-141.
10. "*PEG-labeled Nucleotides and Nanopore Detection for Single Molecule DNA Sequencing by Synthesis*". S. Kumar, C. Tao, M. Chien, B. Hellner, A. Balijepalli, J. W. F. Robertson, Z. Li, J. J. Russo, J. E. Reiner, J. J. Kasianowicz, and J. Ju. *Scientific Reports*. 2012, **2**, 684, 1-8.
11. "*Mitochondrial SNP Genotyping by MALDI-TOF Mass Spectrometry Using Cleavable Biotinylated Dideoxynucleotides*". C. Qiu, S. Kumar, J. Guo, J. Lu, S. Shi, S.M. Kalachikov, J.J. Russo, A.B. Naini, E.A. Schon and J. Ju. *Analytical Biochemistry*, 2012, **427**, 202-210.
12. "*Design and Synthesis of Cleavable Biotinylated Dideoxynucleotides for DNA Sequencing by MALDI-TOF Mass Spectrometry*". C. Qiu, S. Kumar, J. Guo, L. Yu, W. Guo, S. Shi, J. J. Russo, J. Ju. *Analytical Biochemistry*, 2012, **427**, 193-201.
13. "*Fluorescent Hybridization Probes for Nucleic Acid Detection*". J. Guo, J. Ju, N.J. Turro. *Anal. Bioanal. Chem*. 2012, **402**, 3115-3125.
14. "*CdSe/ZnS Core Shell Quantum Dot-based FRET Binary Oligonucleotide Probes for Detection of Nucleic Acids*". Y. Peng, C. Qiu, S. Jockusch, A.M. Scott, Z. Li, N.J. Turro, NJ, J. Ju. *Photochem. Photobiol. Sci*. 2012, **11**, 881-884.
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17. "*Cultivation of Enterobacter Hormaechei From Human Atherosclerotic Tissue*". B. Rafferty, S. Dolgilevich, S. Kalachikov, I. Morozova, J. Ju, S. Whittier, R. Nowygrod, E. Kozarov. *J. Atheroscler Thromb*. 2011, **18**, 72-81.
18. "*Translational Control Analysis by Translationally Active RNA Capture/Microarray Analysis*". K. Kudo, Y. Xi, Y. Wang, B. Song, E. Chu, J. Ju, J. J. Russo, and J. Ju. *Nucleic Acids Research*. 2010, 38, e104.

19. "*An Integrated System for DNA Sequencing by Synthesis Using Novel Nucleotide Analogues*". J. Guo, L. Yu, N.J. Turro, J. Ju. *Acc. Chem. Research*. 2010, **43**, 551-563.
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GRANT SUPPORT

(1) R01 R21HG009187 (Bestor, PI; Ju, co-PI) 4/19/17-3/31/19 10%
NIH $608,000
Comprehensive Single Molecule Enhanced Detection of Modified Cytosines in Mammalian Genomes

(2) R01 MH097062-01A1 (Ju, PI) 9/1/13-8/31/17 20%
NIH $5,250,000
An Integrated System for Single Molecule Electronic Sequencing by Synthesis

(3) Sponsored Research Support (Ju, PI) 9/01/12-9/01/17 10%
Genia Technologies $6,300,000
Design & Synthesis of Tagged Nucleotides for Single Molecule Nanopore-Based DNA Sequencing

(4) R01 MH097062-01A1 (Ju, PI) 9/10/12-7/31/17 10%
NIH $2,000,000
Genomic Approaches to Deciphering Memory Circuits

(5) Columbia RISE (Ju, PI) 7/01/15-6/30/17 10%
Columbia University $160,000
Single-Cell, High-Resolution Methylation Profiling for Personalized Medicine

(6) R01 HG000225 (Schwartz, PI; Ju, co-PI) 9/01/12-8/31/15 3%
NIH $150,000
New Physical Methodologies for Genomic Analysis

(7) R01 HG005109 (Ju, PI) 9/01/09-6/30/13 10%
NIH/NHGRI $1,800,000
Single Molecule DNA Sequencing by Fluorescent Nucleotide Reversible Terminators

(8) R01NS060762 (Ju, PI) 2/01/08-1/31/12 10%
NIH $2,300,000
Molecular Engineering Approach to Study Long Term Synaptic Plasticity

(9) R01HG003582 (Ju, PI) 10/1/04-7/31/10 15%
NIH/NHGRI $4,000,000
An Integrated System for DNA Sequencing by Synthesis

(10) R01 HG004774-01 (Ju, PI) 8/19/08-5/31/11 10%
NIH/NHGRI $946,000
DNA Sequencing with Reversible dNTP and Cleavable Fluorescent ddNTP Terminators

(11) 1R01MH075026-01 (Ju, PI) 7/01/05-6/30/11 10%
NIH $3,000,000

Gene Expression Analysis of Aplysia Neural Network

(12) R21HG004404 (Ju, PI) 8/01/07-7/31/10 5%
NIH $644,000
3'-O-Modified Nucleotide Reversible Terminators for Pyrosequencing

(13) P01GM073047-01- (Tuschl, PI; Ju, co-PI) 2/1/05-1/31/11 3%
NIH $1,000,000
The Function of Small RNAs in Mammals

(14) P50 HG002806 (Ju, PI) 8/01/03-7/31/08 30%
NIH/NHGRI (Center of Excellence in Genomic Science) $14,000,000

(15) 1R21HG003718-01 (Ju, PI) 7/01/05-6/30/08 5%
NIH $966,000
Modulating Nucleotide Size in DNA for Detection by Nanopore

(16) R01HG003583-01 (Ju, PI) 10/1/04-9/30/08 5%
NIH/NHGRI $560,000
Microbead Integrated DNA Sequencer (MINDS) System

(17) Packard Fellowship for Science & Engineering (Ju, PI) 10/1/01-9/30/07 5%
Digitally Decoding DNA Using Photocleavable Mass Tags $625,000

(18) UO1 1UC1AI062705 (Lipkin, PI; Ju, co-PI) 9/30/04-8/31/07 5%
NIH $3,000,000
Mass Tag PCR Detection of Respiratory Pathogens

(19) Sensing and Imaging Initiative (Ju, PI) 3/15/01-3/14/04 15%
National Science Foundation $504,581
Fluorescence Imaging Chip System for Massive Parallel DNA Sequencing

(20) R21 HG002425 (Lipkin, PI; Ju, Co-PI) 7/01/03-6/30/05 5%
Mass-Tag PCR Detection of Viral Pathogens $390,000

(21) NSF0088001 (Leonard, PI; Ju, Co-PI) 3/15/01-4/14/05 5%
Curriculum in Genomic Engineering $499,000

(22) NIH R21 HG002425 (Bestor PI; Ju Co-PI) 5/01/02-4/30/04 5%
Methylation Landscape of the Human Genome $390,000

INVITED LECTURES

1. "*Molecular Engineering Approaches for DNA Sequencing by Synthesis: A New Paradigm for Precision Medicine*". Columbia Engineering Event in the Columbia Global Center in Beijing, 6/23, 2017, Beijing, China.
2. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". NGS Tech & Applications Congress/2nd Microfluidics Congress/3rd qPCR & Digital PCR Congress, 7/25-16, 2017, Philadelphia.
3. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". 3rd Annual NGS & Clinical Diagnostics USA Congress & Single Cell Analysis USA Congress 10/23-24, 2017, Boston.
4. "*Molecular Engineering Approaches for DNA Sequencing by Synthesis: A New Paradigm for Precision Medicine*". Direct Genomics, Inc, 12/12, 2017, Shenzhen, China.
5. "*Molecular Engineering Approaches for DNA Sequencing by Synthesis: A New Paradigm for Precision Medicine*". The Graduate School at Shenzhen, Tsinghua University, 12/13, 2017, Shenzhen, China.
6. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". The 4th Next Generation DNA Sequencing Research and Development Conference, 3/31, 2017, Hangzhou, China.

7. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". The 11th International Conference on Genomics, 11/4-11/6, 2016, China National Genebank, Shenzhen.
8. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". Next Generation Sequencing and Single Cell Analysis USA Congress, 27-October 28, 2015, The Joseph B. Martin Conference Center at Harvard Medical School, Boston.
9. "*Molecular Engineering Approaches for DNA Sequencing: a New Paradigm for Personalized Medicine*". Qualcomm Technologies, Inc., June 16, 2015, San Diego, California.
10. "*Molecular Engineering Approaches for DNA Sequencing: a New Paradigm for Personalized Medicine*". Symposium on Personalized Medicine, Columbia Program in Bangkok, July 1, 2014, Bangkok, Thailand.
11. "*The Landscape of Novel DNA Sequencing Technology*". CapitalBio Corporation/National Engineering Research Center for Beijing Biochip Technology, August 13, 2014, Beijing, China.
12. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". Keynote Lecture, 4th Annual Next Generation Sequencing Asia Congress, October 7-8, 2014, Singapore.
13. "*Molecular Engineering Approaches for DNA Sequencing: a New Paradigm for Personalized Medicine*". 150th Anniversary Symposium: Columbia's Engineering Renaissance, Foundation for the Future, Nov 14, 2014, New York.
14. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". 6th Next Generation Sequencing Congress & 2nd Single Cell Analysis Congress, Nov 20-21, 2014, London.
15. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". Pioneer Workshop 2014 on Nanopore and Nanofluidics –Physics and Application as Biodevices, February 7-8, 2014, Osaka, Japan.
16. "*The Landscape of DNA Sequencing*". Seminar at 454 Life Sciences, a Roche Company, January 8, 2014, Branford, CT
17. "*Molecular Engineering Approaches for Whole Genome Sequencing: a New Paradigm for Personalized Medicine*". QIAGEN Day Seminar, September 17, 2013, Shanghai, China
18. "*Molecular Engineering Approaches for Whole Genome Sequencing: a New Paradigm for Personalized Medicine*". Seminar at Genome Institute of Singapore, September 23, 2013, Singapore
19. "*Molecular Engineering Approaches for Whole Genome Sequencing: a New Paradigm for Personalized Medicine*". Seminar at QIAGEN Taiwan, September 24, 2013, Taipei, Taiwan
20. "*Single Molecule Electronic DNA Sequencing by Synthesis Using Tagged Nucleotides and Nanopore Detection*". 3rd Next-Generation Sequencing Conference, June 19-21, 2013, San Francisco, CA.
21. "*Molecular Engineering Approaches for DNA Sequencing by Synthesis*". Seminar at Sequenom, June 19, 2013, San Diego, CA
22. "*Single Molecule Electronic DNA Sequencing By Synthesis*". New Frontiers in Molecular Diagnostics, May 13, 2013, Boston, MA
23. "*Oligonucleotides as Tags for DNA Sequencing by Synthesis with Nanopore Detection*". NHGRI/NIH Advanced DNA Sequencing Technology Development Meeting, May 1-2, 2013, San Diego, CA.
24. *Single Molecule Electronic DNA Sequencing By Synthesis*, The 14th International Meeting on Human Genome Variation and Complex Genome Analysis, 9/6-9/8, 2012, Shanghai, China.
25. *Molecular Engineering Approaches for DNA Sequencing By Synthesis*, Tsinghua University School of Medicine, September 3, 2012.
26. *Molecular Engineering Approaches for Personalized Medicine*. Stony Brook University School of Medicine, February 23, 2012.

27. *Design and Synthesis of Novel Nucleotide Analogues For DNA Sequencing By Synthesis*. NHGRI/NIH Advanced DNA Sequencing Technology Development Meeting, 4/9-4/12, 2012, San Diego, CA
28. *Molecular Engineering Approaches For DNA Sequencing By Synthesis*, NHGRI/NIH Advanced DNA Sequencing Technology Development Meeting, 4/6-4/7, 2011, San Diego, CA.
29. *Molecular Engineering Approaches for DNA Sequencing By Synthesis: a New Paradigm for Personalized Medicine*, The First Molecular Diagnosis Conference, 6/22-6/24, 2010, Beijing, China,
30. *Toward the $1000 Genome: Molecular Engineering Approaches for DNA Sequencing by Synthesis*, 2009 International Conference on Genomics, 11/2-11/5, 2009, Shenzhen, China.
31. *Toward the $1000 Genome: Molecular Engineering Approaches for DNA Sequencing by Synthesis*, 2008 International Conference on Genomics, 11/2-11/5, 2008, Hong Kong, China.
32. *Molecular Engineering Approaches to Deciphering the Genome*, 2007 International Conference on Genomics, 10/30-11/2, 2007, Hong Kong, China.
33. *Toward the $1000 Genome: Molecular Engineering Approaches for DNA Sequencing by Synthesis*, The Chinese Biological Investigators Society Biennial Symposium, July 21–24, 2007, Beijing, China.
34. *Molecular Engineering Approaches to Deciphering the Genome*, New York Academy of Sciences Symposium, Toward the $1,000 Genome: Next-Generation Strategies for DNA Sequencing, November 8, 2007.
35. *Four-Color DNA Sequencing by Synthesis on Chip Using Cleavable Fluorescent Nucleotide Reversible Terminators*, Advances in Genome Biology and Technology meeting, February 8, 2007, Marco Island, Florida.
36. *Molecular Engineering Approaches to Create New Paradigms for Genomic Medicine*, Beijing University Health Science Center, October 26, 2006.
37. *Molecular Engineering Approaches to Deciphering the Genome*, International Conference on Genomics, Hangzhou, China, October 25, 2006.
38. *Molecular Engineering Approaches for New Paradigm in Genomics Research*, University of Wisconsin at Madison, February 10, 2006.
39. An Integrated System for DNA Sequencing by Synthesis, February 7, 2006, Marco Island, Florida.
40. *Molecular Engineering Approaches to Deciphering Genomic Information*, Broad Institute of Harvard and MIT, February 3, 2006.
41. *Chemical and Molecular Engineering Approaches for New Paradigm in Genomics Research*, Albert Einstein College of Medicine, April 20, 2005
42. *Molecular Engineering Approaches for DNA Sequencing by Synthesis Using Photocleavable Nucleotides*, Northwestern University, April 6, 2005.
43. *Four-Color DNA Sequencing by Synthesis on a Chip Using Photocleavable Fluorescent Nucleotide Analogues*, Applied BioSystems, Inc. California, December 7, 2004.
44. *Chemical and Molecular Engineering Approaches for New Paradigm in Genomics Research*, Affymetrix, Inc. California, December 8, 2004.
45. *Four-Color DNA Sequencing by Synthesis on a Chip Using Photocleavable Fluorescent Nucleotide Analogues*, 14th International Genome Sequencing and Analysis Conference, September 29, 2004, Washington, DC.
46. *Photocleavable Fluorescent Nucleotides for DNA Sequencing on a Chip Constructed by Click Chemistry*, BioArrays-2004-New York Conference, July 26, 2004.
47. *Chemical and Molecular Engineering Approaches for New Paradigm in Genomics Research*. Beijing Capital University of Medical Sciences, July 4, 2004.
48. *Chemical and Molecular Engineering Approaches for New Paradigm in Genomics Research*. Chinese Academy of Medical Sciences, July 5, 2004.

49. *Chemical and Molecular Engineering Approaches for New Paradigm in DNA Sequencing and Analysis*. BioArrays-2003-New York Conference, October 1, 2003.
50. *Chemical and Molecular Engineering Approaches to Deciphering Genomic Information*, Sandia National Laboratory, Albuquerque, New Mexico, April 21, 2003.
51. *Chemical Approaches for Massive Parallel DNA Sequencing*, Perkin Elmer, Boston, January 20, 2003.
52. *Chemical Approaches for Digital Detection in Genomics*, Packard Fellow Annual Conference, Monterey, California. September 19-21, 2002.
53. *Chemical Approaches for Multiplex Genotyping*, Bruker Daltonics, Billerica, Massachusetts, August 20, 2002.
54. *Chemical Approaches for Deciphering Genomic Information,* Designer Molecules for Biosensor Applications, Cold Spring Harbor laboratory, August 17-20, 2002.
15. *Digital Detection in Genomics through Chemistry*, University of Southern California, Los Angeles, March 29, 2002.
16. *CFET Molecular Tags and Solid Phase Capturable Dideoxynucleotides for Multiplex Genetic Analyses*, University of Tennessee, Knoxville, March 14, 2002.
17. *Combinatorial Fluorescence Energy Transfer Tags: New Molecular Tools for Genomics Applications*, Post 15th International Conference on Phosphorus Chemistry, Beijing, China, August 6-8, 2001.
18. *High-Throughput Gene Expression Analysis Using MicroSAGE Libraries and 96-Capillary DNA Sequencer*, Society of Toxicology 40th Annual Meeting, Symposia on Toxogenomics, March 25-29, 2001, San Francisco.
19. *Combinatorial Fluorescent Energy Transfer Tags and Their Application for Multiplex Genetic Analyses*, 13th Annual Lasers and Electro Optics Society Meeting, November 13-16, 2000, Puerto Rico.
20. *High-throughput Technologies for Genomic Research*, October 22, 1999, Industrial Associates Symposium, Columbia University Department of Chemistry, New York.
21. *Novel Fluorescent Reagents and Solid Phase Sequencing Chemistry for Genetic Analyses*, 1999 Pacific Conference on Chemistry and Spectroscopy, October 6-8, 1999, Ontario, California.
22. *Combinatorial Fluorescent Energy Transfer Tags for Multiplex Biological Assays*, August 23, 1999, Aclara Biosciences. Inc. Mountain View, California.
23. *Fluorescence Energy Transfer to DNA Sequencing and Gene Expression Analysis*, November 15, 1999, National Institutes of Standards and Technology, Gaithersburg, Maryland.
24. *Application of Fluorescence Energy Transfer to DNA Sequencing and Gene Expression Analysis*, NATO Advanced Research Workshop: Polymer Structure and Transport in Confined Spaces, June 20-25, 1999, Bikal, Hungary.
25. *High Throughput Technologies for Genomics Research*, Columbia Genome Center and Department of Chemical Engineering, Columbia University, November 11, 1998.
26. *High Throughput Technologies for Genomics Research*, University of Southern California School of Pharmacy, June 26, 1998.
27. *High Throughput Technologies for Genomics Research*, Human Genome Meeting, The Human Genome Organization, Turin, Italy, March 28-30, 1998.
28. *High Throughput DNA Sequencing Technology Development: Solid Phase DNA Sequencing with MALDI- TOF MS/Multiplex Fluorescent DNA Sequencing/96 Capillary Array DNA Sequencer*, After the Genome 3: Redefining Functional Genomics, Santa Fe, NM., October 25-29, 1997.
29. *High Throughput DNA Sequencing Technology Development at Incyte*, Human Genome Meeting, The Human Genome Organization, Toronto, Canada, March 6-8,1997.
30. *Energy Transfer Primers: a New Fluorescence Labeling Paradigm for DNA Sequencing and Analysis*, After the Genome 2: Towards a Predictive Functional Genomics, Santa Fe, NM., November 9-12, 1996.

31. *High-throughput DNA Sequencing Using Capillary Array DNA Sequencer and Energy Transfer Fluorescent Primers*, CHI 3rd Annual Conference on the Human Genome Project: Commercial implications, San Francisco, CA., March 4-6, 1996.
32. *High-performance DNA Sequencing Using Energy Transfer Fluorescent Primers*, DOE Human Genome Program Contractor-Grantee Workshop V, Santa Fe, NM., January 28-Febrnary 1,1996.