



CENTER of EXCELLENCE  
for ENGINEERING BIOLOGY



## MEETING AGENDA

### **GP-write: A Grand Challenge Using DNA Synthesis, Gene Editing and Other Technologies to Understand, Engineer and Test Living Systems**

**May 9-10, 2017**

**New York Genome Center  
101 Avenue of the Americas  
New York, NY 10013**

This meeting will be primarily comprised of short talks, format is: main talk with 2 minutes of questions and 1 minute transition within the time allotted.

#### **MAY 9, 2017**

8:30 – 9:00 REGISTRATION AND CONTINENTAL BREAKFAST

9:00 – 9:10 WELCOME TO THE NEW YORK GENOME CENTER  
Overview of the Meeting, Nancy J Kelley, Nancy J Kelley & Associates  
(Confirmed)

9:10–10:20 OVERVIEW OF PROJECT: FROM READING TO WRITING GENOMES

- Jef Boeke, NYU Langone Medical Center, George Church, Harvard Medical School | Evolution of GP-write and Progress to Date (20 minutes)  
(Confirmed)
- Edison Liu, The Jackson Laboratory | Human Genomes to Functional Models of Disease: (10 minutes)(Confirmed)
- Carrie Albertin, University of Chicago | Octopus Genome Insights: (10 minutes)(Confirmed)
- June Medford, Colorado State University | Plants as Platforms for Human Designed Sustainability (10 minutes) (Confirmed)

## MEETING AGENDA

### GP-write: A Grand Challenge to Understand, Engineer and Test Living Systems

May 9-10, 2017

- Jonathan D Moreno, University of Pennsylvania and Barbara Evans, University of Houston Law Center | Ethical Frameworks for GP-write: (10 minutes each) (Confirmed)

10:20 – 10:50 GP-write: PRESENTATION/DISCUSSION OF NEW PILOT PROJECTS

- Yasunori Aizawa, Tokyo Institute of Technology | Synthetic Screening for Essential Introns and Retroelements in Human and Animal Cells (10 minutes) (Confirmed)
- Neville Sanjana, New York Genome Center | Precision Human Genome Engineering of Disease-Associated Noncoding Variants (10 minutes) (Confirmed)
- Jeantine Lunshof, Harvard Medical School and University Medical Center, Groningen | Framing and Addressing the Ethical Issues Raised by GP-write: Anticipate, Understand and Influence (10 minutes) (Confirmed)

10:50–11:20 BREAK

11:20 – 12:00 GP-write: PRESENTATION/DISCUSSION OF NEW PILOT PROJECTS (cont.)

- Max Berry | Isothermal Amplification Array to Extend Synthetic Gene Sequence; Recombinase-Mediated Assembly (10 minutes) (Confirmed)
- Nili Ostrov, Harvard Medical School | Ultrasafe Cell Line (10 minutes)(Confirmed)
- Gigi Gronvall, Johns Hopkins Center for Health Security | Understanding and Anticipating Governance Systems (Local, state, national and international) (10 minutes) (Confirmed)
- Matt Maurano, NYU Langone Medical Center | Synthetic Regulatory Genomics (10 minutes) (Confirmed)

12:00 – 1:00 PANEL/GROUP DISCUSSION | LUNCH (provided)

- Required Elements of an Ethical, Social, and Legal Roadmap for GP-write  
Moderators: Jonathan D Moreno, University of Pennsylvania and Barbara Evans, University of Houston Law Center (Confirmed)
  - Nicole Lockhart, National Human Genome Research Institute (Confirmed)
  - Robert Smith, King's College London (Confirmed)

## MEETING AGENDA

### GP-write: A Grand Challenge to Understand, Engineer and Test Living Systems

May 9-10, 2017

- Jeantine Lunshof, Harvard Medical School and University Medical Center, Groningen (Confirmed)

1:00 – 4:10 GP-write RELATED RESEARCH AREAS

1:00 – 2:00 Microorganism Genomes

#### Sc 2.0 Scientific Talks

- Yizhi Cai, University of Edinburgh (15 minutes) (Confirmed)
- Junbiao Dai, Tsinghua University, Unlock the Power of SCRaMbLE with ReSCUeS (15 minutes) (Confirmed)
- Yingjin Yuan, Tianjin University, Redesign of Yeast Chromosome and Potential Application (15 minutes) (Confirmed)

Kazuhito Tabata, The University of Tokyo | Technology for the Construction of Synthetic Bacteria (15 minutes) (Confirmed)

2:00 – 2:30 Microbiome Engineering

- Jeffrey Way, Wyss Institute of Biological Engineering | Rational Engineering of Bacterial Consortia within the Gut Microbiome (10 minutes)(Confirmed)
- Harris Wang, Columbia University Department of Systems Biology | Engineering the Microbiome and Mammalian Genome with Enhanced Metabolic Functions, (10 minutes) (Confirmed)
- Julia Oh, The Jackson Laboratory, The Human Skin Microbiome: Metagenomes to Therapeutics (10 minutes) (Confirmed)

2:30 – 3:00 Engineering Intercellular Communication and Other Complex Systems

- Virginia Cornish, Columbia University (10 minutes) (Confirmed)
- Neta Agmon, NYU Langone Medical Center (10 minutes) (Confirmed)
- Josh Leonard, Northwestern University (10 minutes)(Confirmed)

3:00 – 3:30 BREAK (James e Pricer [www.jepricer.com](http://www.jepricer.com)) (Confirmed)

3:30 – 4:10 Genome Engineering in Mammalian Systems

## MEETING AGENDA

### GP-write: A Grand Challenge to Understand, Engineer and Test Living Systems

May 9-10, 2017

- Karen Miga, Jack Baskin School of Engineering, UC at Santa Cruz | Assembling Centromeres in Silico (10 minutes)(Confirmed)
- Alina Chan, Harvard Medical School | Human Artificial Chromosomes That Shuttle the Three Kingdoms (10 minutes) (Confirmed)
- Luhan Yang, eGenesis (10 minutes)(Confirmed)
- Dieter Egli, Columbia University | Haploid Embryonic Stem Cells (10 minutes) (Confirmed)

#### 4:10 – 4:40 CENTER OF EXCELLENCE FOR ENGINEERING BIOLOGY

- Overview: Nancy J Kelley, Nancy J Kelley & Associates (10 minutes) (Confirmed)
- GP-write Scientific Executive Committee: Roundtable discussion amongst Jef Boeke, NYU Langone Medical Center, George Church, Harvard Medical School, Pam Silver, Wyss Institute, Farren Isaacs, Yale University (20 minutes) (Confirmed)
  - Scientific Roadmap and Milestones
  - Evaluation of Pilot Projects
  - Composition

#### 4:40 – 5:25 PILOT PROJECT PITCHES

- 5 minute “elevator pitch” speaking opportunities for scientists to present new ideas for GP-write pilot projects selected from Abstracts submitted prior to the meeting
  - Kenji Tsuge, Kobe University, “Long and precise genomic DNA construction using *Bacillus subtilis*” (Confirmed)
  - Tom Ellis, Imperial College, London, “Rearrangement and Reduction at Human Genomic Loci” (Confirmed)
  - Rosario Isasi, University of Miami Leonard M. Miller School of Medicine, “Rewriting Regulation? A Comparative Policy Study of Natural vs. “Synthetic Cells”, Organoids and Human Genomes” (Confirmed)
  - Dieter Egli, Columbia University, “Stable Haploid Human Pluripotent Stem Cells” (Confirmed)
  - Bogumil Karas, University of Western Ontario, “Development of a Pipeline for Precision Cloning and Effective Storage of Large Synthetic or Natural Human DNA Fragments” (Confirmed)

## MEETING AGENDA

### GP-write: A Grand Challenge to Understand, Engineer and Test Living Systems

May 9-10, 2017

- Jacob Beal, Raytheon BBN Technologies, “Genome-scale Design Representation with SBOL” (Confirmed)
- Wen Shan Yew, “Winning the Fight Against Diabetes: Singapore to GP-write” (Confirmed)
- Stephan Zuchner, University of Miami Leonard M. Miller School of Medicine, “An *In-Situ* Digital Annotation System to Document and Safeguard GP-write Applications” (Confirmed)
- C. Neal Stewart, Jr., University of Tennessee, “Installing “Mini-Symplastomes” in Crops”

6:00 – 7:30      EVENING COCKTAILS

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### GP-write: A Grand Challenge to Understand, Engineer and Test Living Systems

May 9-10, 2017

#### MAY 10, 2017

8:00 – 9:00 PRESS BRIEFING

8:30 – 9:00 REGISTRATION AND CONTINENTAL BREAKFAST

9:00 – 9:10 WELCOME TO THE NEW YORK GENOME CENTER  
Announcements, Nancy J Kelley, Nancy J Kelley & Associates (Confirmed)

9:10–11:10 SCIENTIFIC TALKS ON TECHNOLOGY DEVELOPMENT AND TECHNICAL CHALLENGES

9:10 – 9:40 Genome Engineering Technologies Utilized for Large-Scale Editing (Moderator: Jeffery A Schloss) (Confirmed)

- Leslie Mitchell, NYU Langone Medical Center | Protein Based Target Recognition Systems (Tyr/Ser SSRs, Meganucleases, SFNs, TALENs) and RNA-based Target Recognition Systems (Group II Introns, CRISPR/Cas 9 System)(10 minutes)(Confirmed)
- Farren Isaacs, Yale University | DNA Target Recognition Systems (MAGE, CAGE) (10 minutes) (Confirmed)
- Ron Weiss, MIT | Synthetic Biology Circuits in Mammalian Cells for Health Related Applications (10 minutes)(Confirmed)

9:40 – 10:40 Engineering from Synthesized DNA (Moderator: Andrew Hessel)(Confirmed)

- Duhee Bang, Yonsei University | DNA Synthesis Technologies (10 minutes)(Confirmed)
- J William Efcavitch | Molecular Assemblies (10 minutes) (Confirmed)
- Naresh Menon, ChromoLogic | SynGen™: Platform for Rapid Assembly and Transfer of Large DNA Constructs (10 minutes) (Confirmed)
- Emily Leproust | Twist Bioscience (10 minutes) (Confirmed)
- Helge Bastian | ThermoFisher Scientific, Engineering Nucleic Acids to Support Building Genomes (10 minutes)(Confirmed)

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### GP-write: A Grand Challenge to Understand, Engineer and Test Living Systems

May 9-10, 2017

- Thomas Ybert | DNA Script (10 minutes) (Confirmed)

10:40 – 11:10 Software Development Tools (Moderator: Andrew Hessel)(Confirmed)

- Sean Ward, Synthace | Achieving Digital Biology (10 minutes) (Confirmed)
- Joel Bader, Johns Hopkins Biomedical Engineering | Genome CAD Design (10 minutes) (Confirmed)
- Azam Khan, Director, Complex Systems Research | Autodesk (10 minutes) (Confirmed)

11:10–11:30 BREAK

11:30 – 12:50 INFRASTRUCTURE DEVELOPMENT

11:30 – 12:10 Genome Engineering Foundries: Panel Discussion. Moderator: Jeffery A Schloss (Confirmed)

- Hille Tekotte, Edinburgh Genome Foundry (10 minutes) (Confirmed)
- Leslie Mitchell, Genome Foundry @ ISG (10 minutes)(Confirmed)
- Ben Gordon, MIT-Broad Foundry (10 minutes)(Confirmed)
- Dave McClymont, London DNA Foundry (10 minutes) (Confirmed)

12:10 – 12:50 Strain Engineering Technologies in Industry

- Nathan Wood, President, SGI-DNA | Trends in Writing DNA (10 minutes) (Confirmed)
- Jay Konieczka enEvolv | Biologically Inspired Engineering of Microorganisms (10 minutes) (Confirmed)
- Kevin Ness, CEO, Muse Bio | Genome Scale Engineering (10 minutes) (Confirmed)

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May 9-10, 2017

- John Fuller, Field Applications Scientist, Labcyte | Synthetic Biology Applications Using Echo\* Acoustic Dispensing Technology (10 minutes) (Confirmed)

12:50 – 1:50 OPEN DISCUSSION | WORKING GROUP MEETINGS | LUNCH (provided)

#### Working Groups:

- Social, Legal and Ethical Issues
- Technology and Infrastructure Development
- High Performance Computing and Bioinformatics
- Safety Engineering
- Standards, Quality Control and Reporting
- Intellectual Property
- Public Communications, Outreach
- Education
- Policy Development

#### Funders Meeting:

NIH, NSF, DARPA, Wellcome Trust/Sanger Institute, Japan Science and Technology Agency, New York City Economic Development Corporation, New York State Empire Development, India Department of Biotechnology

1:50 – 2:30 HIGH PERFORMANCE COMPUTING AND COMPUTATIONAL BIOLOGY

- High Performance Computing (Open, Shared Systems)
  - Mark Gerstein, Yale University | Scaling Computation to Keep Pace with Data Generation (10 minutes) (Confirmed)
  - Brian Bot, Sage Bionetworks | Enabling Communities of Researchers Working Across Institutional Boundaries (10 minutes) (Confirmed)
  - Jason Bobe, Mount Sinai | Participatory Models of Biomedical Research and Innovation (10 minutes) (Confirmed)
- Bioinformatics & Computational Tools to Assemble, Understand and Annotate Genomes and Gene Functions
  - Binay Panda, Ganit Labs | Assembly, Understanding & Annotation of Gene Functions Involved in Terpenoid Biosynthesis (10 minutes)(Confirmed)



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May 9-10, 2017

#### 2:30 – 4:10 WORKING GROUP ROADMAPS

- Social, Legal and Ethical Issues, Barbara Evans, University of Houston Law Center (10 minutes)(Confirmed)
- Technology and Infrastructure Development, Jeffery A Schloss, Independent Consultant (10 minutes)(Confirmed)
- High Performance Computing and Bioinformatics, Chris Dwan, Independent Consultant (10 minutes) (Confirmed)
- Safety Engineering, Farren Isaacs, Yale University (10 minutes)(Confirmed)
- Standards, Quality Control and Reporting, Marc Salit, NIST (10 minutes) (Confirmed)
- Intellectual Property, Kristin Neuman, MPEGLA (10 minutes) (Confirmed)
- Public Communications, Outreach, Jeffrey Bessen, Harvard University (10 minutes) (Confirmed)
- Education, Ellen Jorgensen, Genspace and Natalie Kuldell, Biobuilder (10 minutes) (Confirmed)
- Policy Development, Gigi Gronvall, Johns Hopkins Center for Health Security (10 minutes) (Confirmed)
- bioRxiv: Richard Sever, Cold Spring Harbor Laboratory (10 minutes) (Confirmed)

4:10 – 4:25 WRAP UP AND NEXT STEPS Nancy J Kelley, Nancy J Kelley & Associates (Confirmed)

6:00 PM PRESS TOUR OF THE GENOME FOUNDRY AT ISG

Please note the location of the Genome Foundry is the Alexandria Center, 430 E 29<sup>th</sup> Street, 5<sup>th</sup> Floor. At security, ask for Dr. Boeke and you will be given a photo ID. Allow 45 minutes for transportation from NYGC and entry to Alexandria Center.

ONLY THOSE WHO ARE PREREGISTERED WILL BE ALLOWED INTO THE ALEXANDRIA CENTER AND THE GENOME FOUNDRY.