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NEW GENOME ENGINEERING TECH DEVELOPMENT NEEDS IDENTIFIED BY GP-WRITE TO REDUCE COST AND INCREASE EFFICIENCIES OF LARGE-SCALE GENOME EDITING, RECODING AND WRITING

Registration, agenda available for 2019 GP-write and Sc2.0 meeting Nov. 11-14 in NYC

NEW YORK, October 28, 2019—Key technology development needs to reduce cost and increase efficiencies of large-scale genome editing, recoding and writing are identified with examples of desired milestones during the next 10 years in the roadmap written and shared in a [Science Policy Forum](#) by the [Technology and Infrastructure Working Group](#) of the international [Genome Project-write](#) (GP-write).

The working group is chaired by Jeffery A. Schloss, and lead writer of the roadmap is Nili Ostrov from the Department of Genetics at Harvard Medical School.

Some recommendations include improvements to existing technologies; others are newly emerging. The group identified four high-priority areas for development in synthetic genomics: genome design, DNA synthesis, genome editing and chromosome construction.

“Synthetic genomics—the ability to readily design and write the genomes of complex living cells—would provide unique opportunities to gain biological insights and to tackle problems intractable with current technologies. This is particularly true in medicine, where synthetic genomes could be a transformative force to enhance personalized medicine and offer treatments unattainable by standard therapies,” said Ostrov. “For example, genome writing technology could enable low-cost, high-throughput production of advanced CAR T-cells for immunotherapy or be used to encode the production of edible vaccines in common food crops. The same tools could also give us microbes capable of breaking down common plastics into usable chemicals for future bio-recycling facilities, plants capable of producing pharmaceuticals or monitoring air pollution or tissue cultures that are resistant to viruses, radiation, aging or cancer”.

Similar to other large projects such as the Human Genome Project, achieving these advances requires responsible innovation through international, interdisciplinary participation, with funding from governments and the private sector. With such investments, scientists can develop and disseminate new approaches to maximize impact across sectors such as biomedicine, pharmaceuticals, agriculture and the chemical industry. To achieve the potential scientific, social and economic impact, development and adoption of these technologies requires ongoing public discussion of potential pitfalls.

GP-write has organized a federation of interested scientists around the globe who are committed to developing and applying the needed technology. According to one of its co-founders, Jef Boeke, director of the Institute for Systems Genetics at NYU Langone Health, “There is intense interest in reducing barriers to widely deploying this tech, and there is great excitement about big projects like Sc2.0 that can

engage a broader community.”

The technical recommendations and roadmaps of the Technology and Infrastructure Working Group and the other eight GP-write working groups will be discussed, among other topics important to achieving the potential benefits of genome writing, at the joint Sc2.0 and GP-write meeting scheduled Nov. 11-14. The Institute of Systems Genetics at NYU Langone Health will host the meeting. Registration and the agenda are available now at <https://engineeringbiologycenter.org>.

Authors of the GP-write Technical and Infrastructure Working Group article appearing in Science include Nili Ostrov, Jacob Beal, Tom Ellis, D. Benjamin Gordon, Bogumil J. Karas, Henry H. Lee, Scott C. Lenaghan, Jeffery A. Schloss, Giovanni Stracquadanio, Axel Trefzer, Joel S. Bader, George M. Church, Cintia M. Coelho, J. William Efcavitch, Marc Güell, Leslie A. Mitchell, Alec A. K. Nielsen, Bill Peck, Alexander C. Smith, C. Neal Stewart Jr. and Hille Tekotte.

A full list of roadmaps and working group members are listed at <https://engineeringbiologycenter.org/working-groups>. More information on Genome Project-write may be found at <https://engineeringbiologycenter.org>.

Genome Project-write leadership includes co-founders George Church, Jef Boeke and Andrew Hessel; Todd Peterson; and president and co-executive director, Amy Cayne Schwartz. For more information about the mission and leadership of GP-write, see <https://engineeringbiologycenter.org/about/>.

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Editor’s Note: The Joint Sc2.0 and GP-write meeting is open to pre-registered press. Contact us for a registration code.

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