**Abstract**

In an effort to optimize the manufacturing of parts, we have designed *Clonebots* - a collection of devices and strains that aid in the synthesis and analysis of new parts. Building engineered biological systems requires cumbersome laboratory protocols that significantly impede the advancement of our field. However, there are some unit operations that can be cost-effectively automated at scale in the laboratory such as small volume liquid transfers, fluorescence measurements, and heating/cooling steps. If we can reduce all synthesis and analysis methodology to these simple operations, we can readily automate many aspects of synthetic biology research - a cost-effective, BioCAD-friendly approach to large-scale projects. This project is an effort to solve these basic technical problems of synthetic biology in vivo. We successfully constructed two devices designed to automate synthetic biology: a Gateway cloning device and a genetic self-lysis device.

**Robots and Clonebots working together**

**Plasmid-Based Gateway**

Replacing biochemical manipulation

**Restriction/ligationless part/vector matching in vivo**

**Procedure**

- Transform Entry Vector
- Outgrow in Cm/Amp/Spec

**Successful gateway and lysis without co-transformation**

**Self Lysis-Based Gateway**

Replacing biochemical manipulations and mini-preps

**Lysis Device is installed along with gateway device**

**Procedure**

- PoPS → Lysis Device → Lysis

**Successful gateway and lysis without co-transformation**

**Conventional**

- Biochemical Manipulation
- Gateway Device

**Clonebots**

- Reactant-free
- Highly efficient enzymatic reactions

**Layered Standard Assembly**

- Assembly/layer
- Structured Assembly/layer
- Assembly/layer

**Introduction**

**Conclusion**

1. Gateway device successfully replaced biochemical manipulation in vivo
2. Lysis device further replaced mini-preps when it was installed on the plasmid with the gateway device
3. Further study will replace both mini-preps and transformations with phagemid-based gateway

**Human Practices**

- Purpose: to give form and forum to questions surrounding synthetic biology
- Methodology:
  - Giving larger context to synthetic biology research
  - Raising question of what defines the good life
  - Calling for collaboration between stakeholders
- Production:

**Acknowledgements**

Advisors: Megan DeLoache, Jin Hu, Terry Johnson, Megan Dueck, J. Christopher Anderson

Founded: UC Berkeley iGEM 2008

Undergraduates: Molly Allen, Christie Brown, Aron Lau, Marlee Tichenor, Madhvi Venkatesh, Bing Xia

High School: Cici Chen, Sherine Cheung

Instructors: Jin Hu, Terry Johnson, Megan Dueck, J. Christopher Anderson

Support: Paul Lakatos, Adrian Van Allen

Collaborators: Gaymon Bennett, Paul Lakatos, Adrian Van Allen

Logo Artwork & Design: Vuvox.com

Slide show Interface: invitrogen.com

Home: Vuvox.com