

# Workflow on SynBioHub, SBOLDesigner, and iBioSim

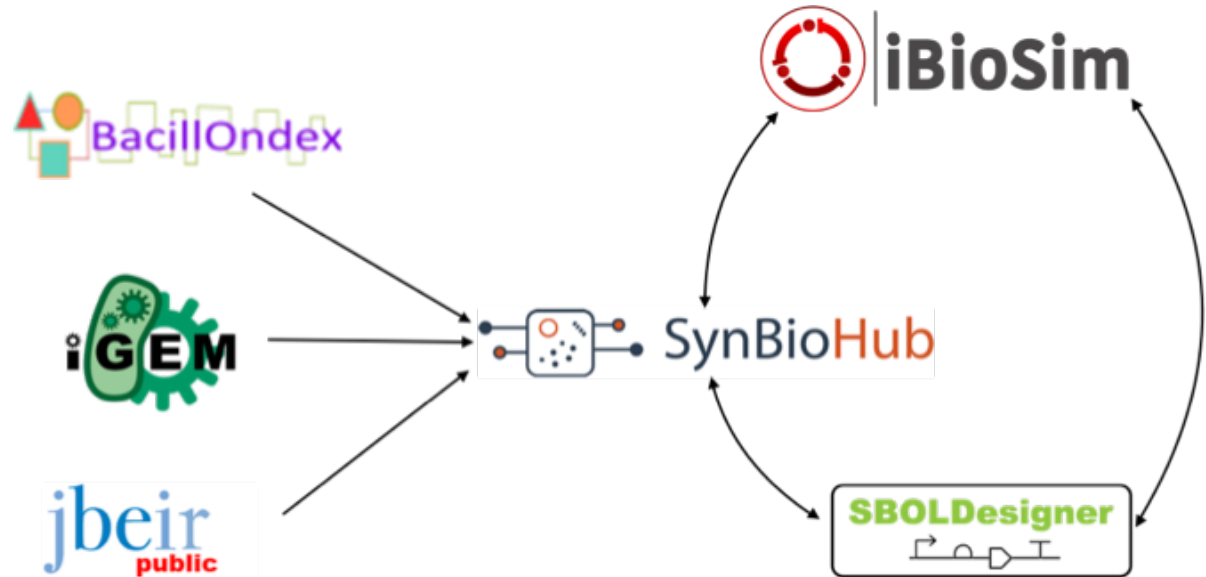
Tramy Nguyen and Chris Myers  
University of Utah

Software for Synthetic Biology Workflows Workshop  
June 7<sup>th</sup>, 2018

# Summary

- Demo of tools chained into a workflow

- **SynBioHub**
- SBOLDesigner
- iBioSim





**SynBioHub** is a *design repository* for people designing biological constructs. It enables DNA and protein designs to be uploaded, then provides a shareable link to allow others to view them. SynBioHub also facilitates searching for information about existing useful parts and designs by combining data from a variety of sources.



**Search** for useful parts and designs

Search

[Browse Design Collections](#)



**Upload** your design for safekeeping

[Submit a Design](#)



**Share** designs for publication or collaboration

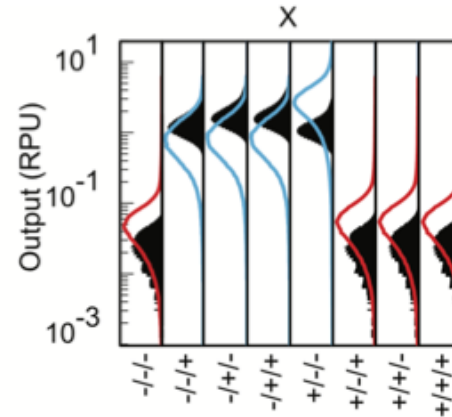
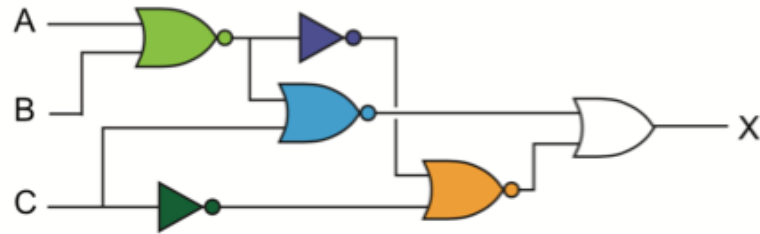
[Manage Submissions](#)

- Online data repository
- RDF triple store
- SynBioHub instances
- Supports SBOL data model and SBOL visual

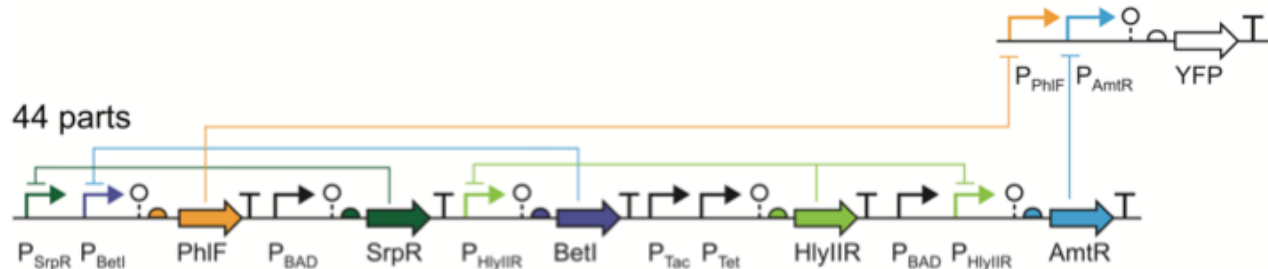


# Rule 30 Example

## 0x78 (Rule 30)



44 parts



# Uploading and Downloading Designs



[Submit](#) [About](#) [Shared with Me](#) [Submissions](#) [Profile](#) [Sign Out](#)

[Home](#)



## SynBioHub

SynBioHub is a *design repository* for people designing biological constructs. It enables DNA and protein designs to be uploaded, then provides a shareable link to allow others to view them. SynBioHub also facilitates searching for information about existing useful parts and designs by combining data from a variety of sources.

**Search** for useful parts and designs


  [Search](#)

[Browse Design Collections](#)

 **Upload** your design for safekeeping

[Submit a Design](#)

# Annotating Design

 SynBioHub

[Submit](#) [About](#) [Shared with Me](#) [Submissions](#) [Profile](#) [Sign Out](#)

[https://synbiohub.org/user/tramyn/Rule30\\_Example/Rule30\\_Example\\_collection/1](https://synbiohub.org/user/tramyn/Rule30_Example/Rule30_Example_collection/1)

## Rule30\_Example

Rule30\_Example\_collection [Version 1](#) [\(Collection\)](#) [?](#)

Created by: [Tramy Nguyen](#) [?](#)

Date created: 2018-05-29 01:59:35 [?](#)

Rule 30 example described on the Cello paper. [?](#)

[Download](#) [Share](#) [Close](#) [Help](#)

### Members

Show  entries


Name	Identifier	Type	Description
<a href="#">circuit_Ox78</a>	<a href="#">circuit_Ox78</a>	Module <a href="#">?</a>	

Showing 1 to 1 of 1 entries (filtered from 28 total entries) [Previous](#) [1](#) [Next](#)

#### Details

- [+ Add description...](#)
- [+ Add notes...](#)
- [+ Add source...](#)

# Attaching Information to a Collection

 SynBioHub

[Submit](#) [About](#) [Shared with Me](#) [Submissions](#) [Profile](#) [Sign Out](#)

[https://synbiohub.org/user/tramyr/Rule30\\_Example/Rule30\\_Example\\_collection/1](https://synbiohub.org/user/tramyr/Rule30_Example/Rule30_Example_collection/1)

## Rule30\_Example

Rule30\_Example\_collection [Version 1](#) [\(Collection\)](#) [?](#)

Created by: [Trammy Nguyen](#) [?](#)

Date created: 2018-05-29 02:09:13 [?](#)

Rule 30 example described on the Cello paper.[?](#)

[Download](#) [Share](#) [Close](#) [Comment](#)

### Members

Show  entries

Name	Identifier	Type	Description
<a href="#">circuit_0x78</a>	<a href="#">circuit_0x78</a>	Module <a href="#">?</a>	

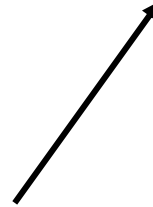
Showing 1 to 1 of 1 entries (filtered from 28 total entries) [Previous](#) [1](#) [Next](#)

#### Details

[+ Add description...](#)

[Notes](#)

# SynBioHub Visualizes Provenance



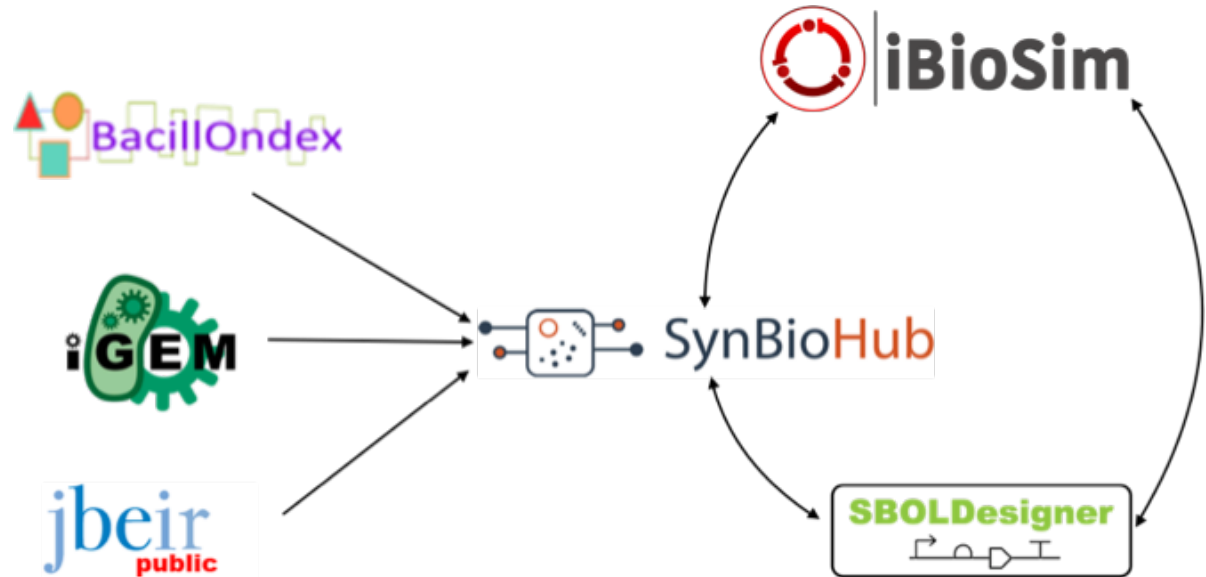
SynBioHub

- Upload and download designs in SBOL format
- Annotations
- Attachments
- Provenance

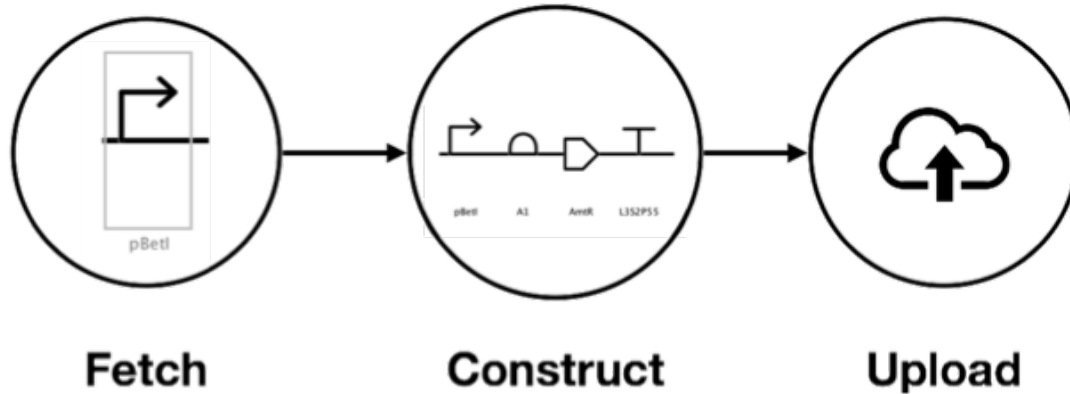


# Summary

- Demo of tools chained into a workflow
  - SynBioHub
  - **SBOLDesigner**
  - iBioSim



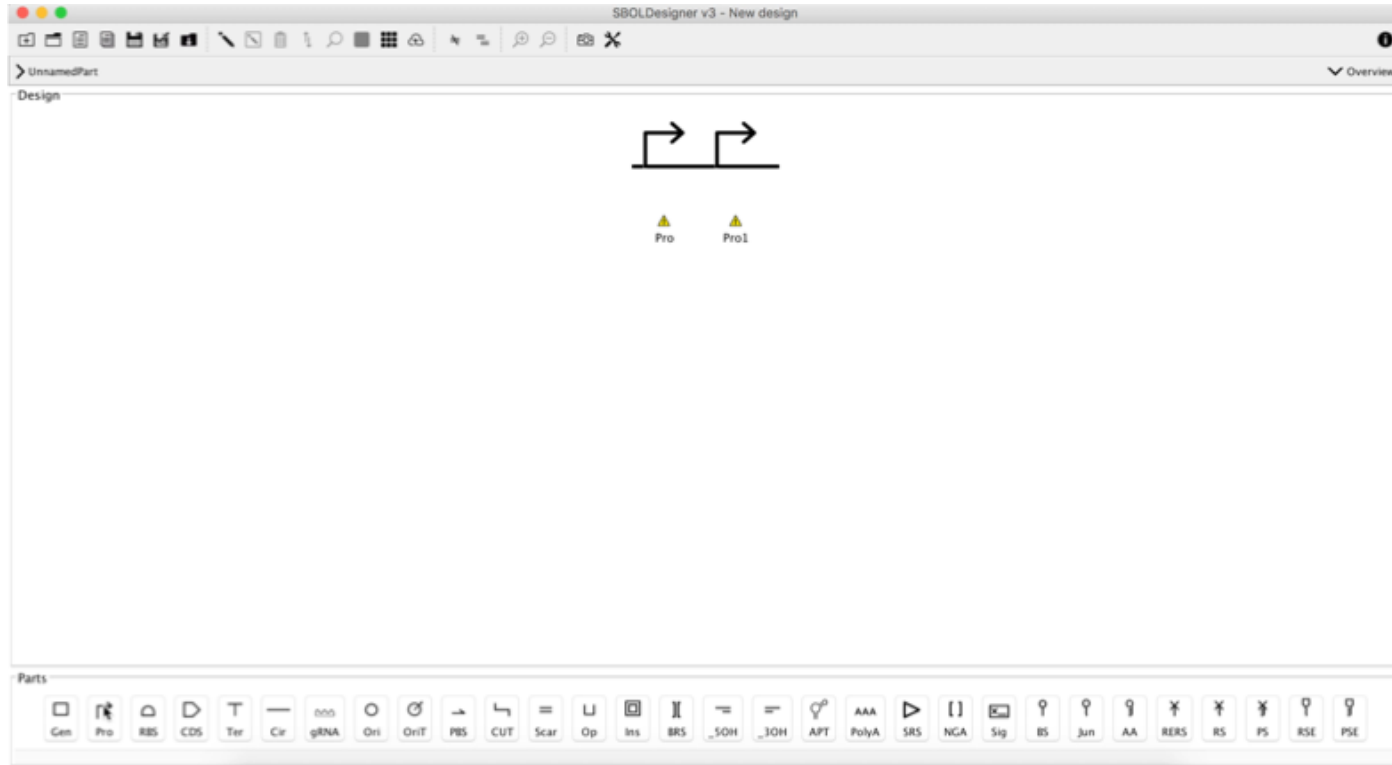
# SBOLDesigner



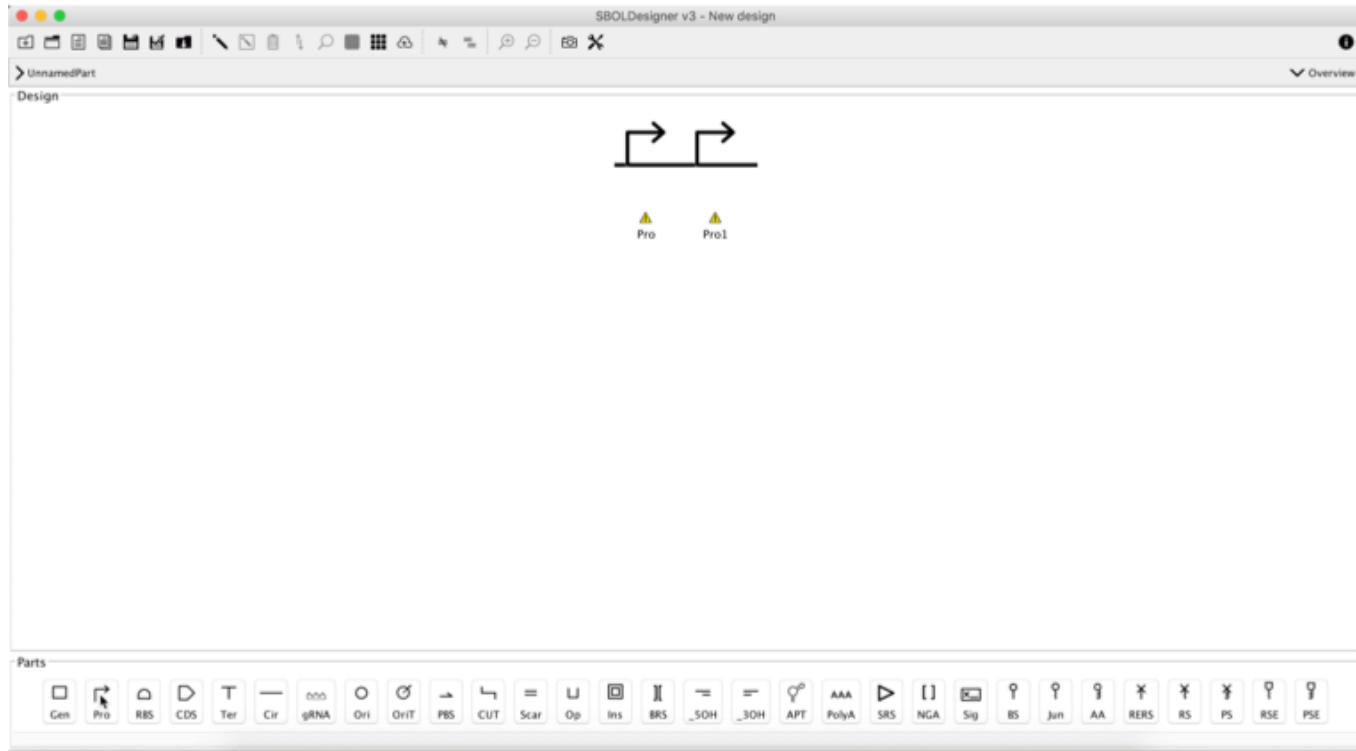
Zhang et al. *ACS Synth. Biol.*, 2017

- Computer Aided Design Tool (CAD)
- Focus support on DNA level designs
- Supports SBOL data model and SBOL visual

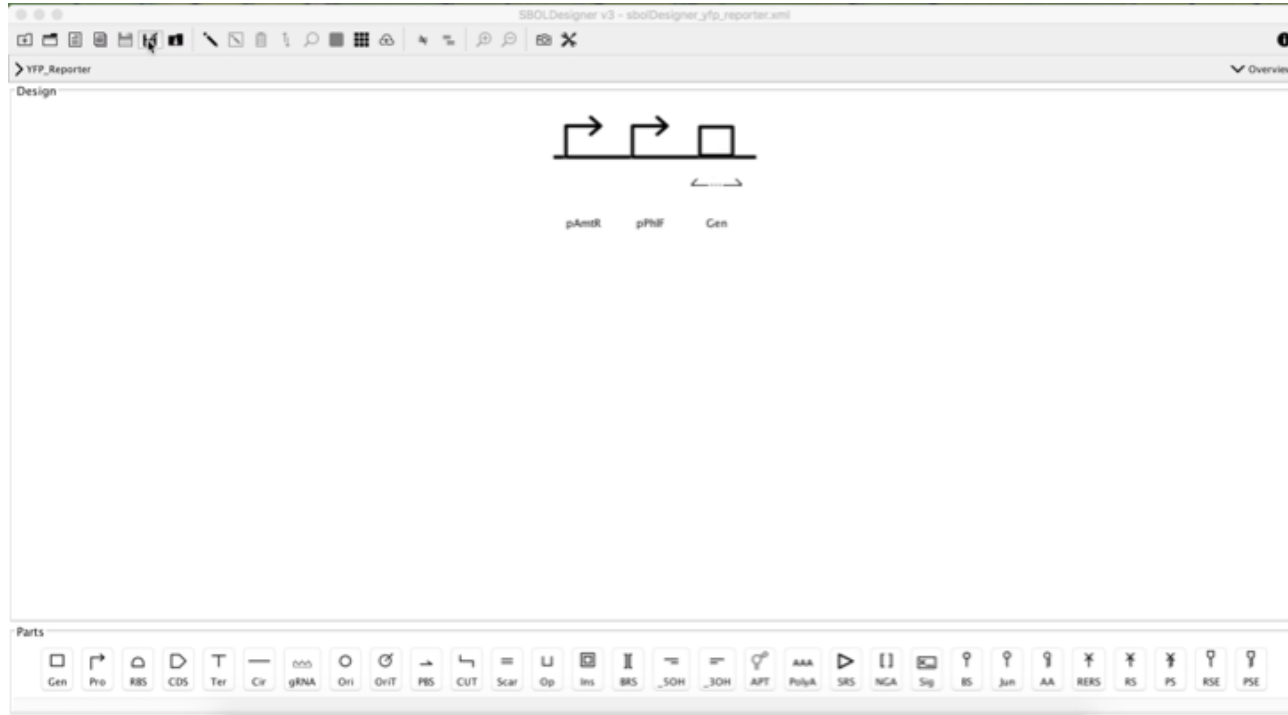
# Part Annotation in SBOLDesigner



# Building Designs using Hierarchy

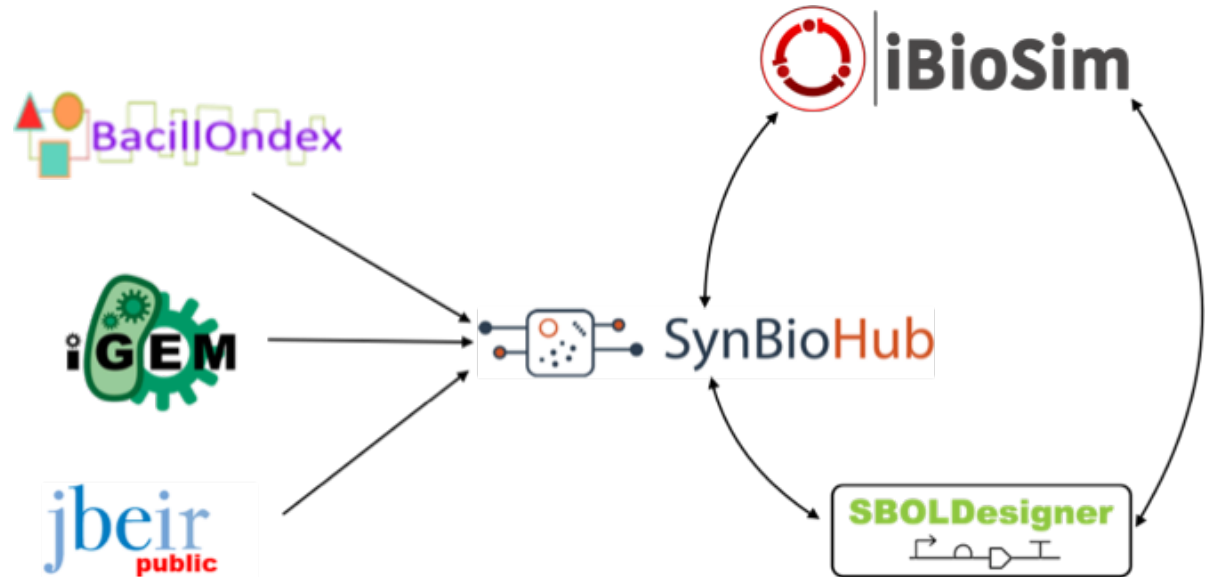


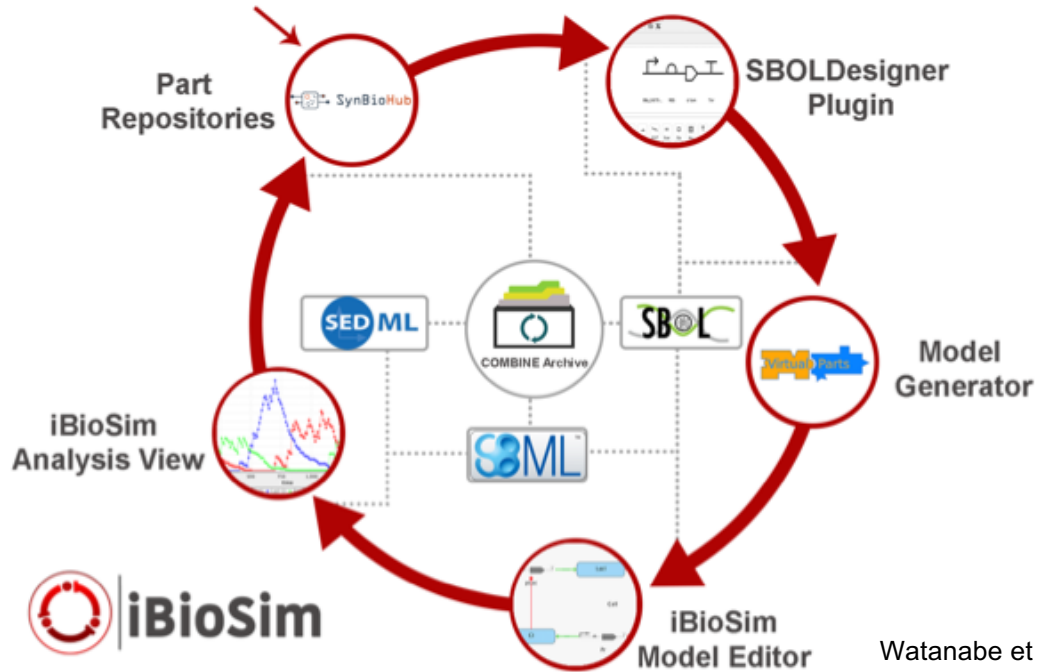
# Uploading to SynBioHub in SBOLDesigner



# Summary

- Demo of Tools chained into a workflow
  - SynBioHub
  - SBOLDesigner
  - iBioSim



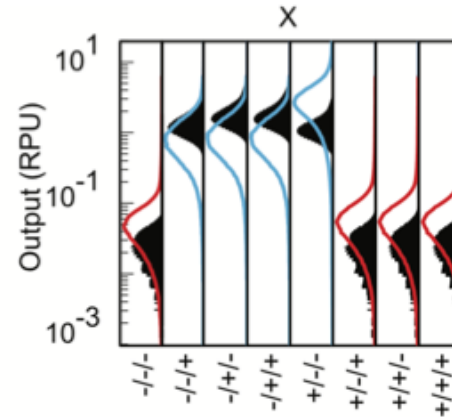
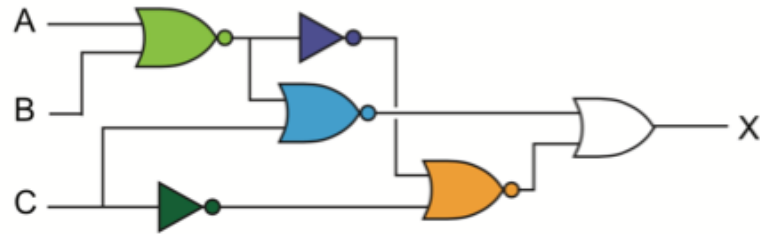


Watanabe et al. *ACS Synth. Biol.*, 2018

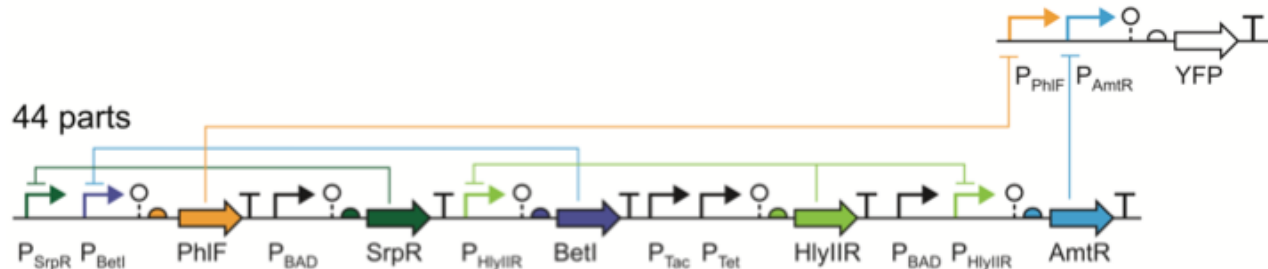
- A CAD tool
- Design and model genetic circuits
- Supports a variety of the COMBINE data standards

# Rule 30 Example

## 0x78 (Rule 30)



44 parts






# Modeling and Simulation



# Viewing Provenance in SynBioHub

 **SynBioHub**

[Submit](#) [About](#) [Shared with Me](#) [Submissions](#) [Profile](#) [Sign Out](#)

[https://synbiohub.org/user/tramyn/iBioSim\\_Rule30/iBioSim\\_Rule30\\_collection/1](https://synbiohub.org/user/tramyn/iBioSim_Rule30/iBioSim_Rule30_collection/1)

## iBioSim\_Rule30

iBioSim\_Rule30\_collection [Version 1](#) [\(Collection\)](#) [?](#)

Created by: [Tram Nguyen](#) [?](#)

Date created: 2018-05-29 05:06:19 [?](#)

Rule 30 example built from iBioSim [?](#)

[Download](#) [Share](#) [Close](#) [Help](#)

### Members

Show  entries

Search:

Name	Identifier	Type	Description
<a href="#">circuit_0x78_simulation__graph.png</a>	<a href="#">circuit_0x78_simulation__graph.png</a>	Attachment <a href="#">?</a>	
<a href="#">circuit_0x78_simulation__report.png</a>	<a href="#">circuit_0x78_simulation__report.png</a>	Attachment <a href="#">?</a>	

Showing 1 to 2 of 2 entries (filtered from 60 total entries)

[Previous](#) [1](#) [Next](#)

Details

[+ Add description...](#)  
[+ Add notes](#)

# Conclusion

- SBOL enables workflow
- SBOL is intended for wide community of synthetic biologists and not just for designers.

# Acknowledgements

## iBioSim Developers

Nathan Barker  
Scott Glass  
Kevin Jones  
Hiroyuki Kuwahara  
Curtis Madsen  
Nam Nguyen  
Tramy Nguyen  
Tyler Patterson  
Nicholas Roehner  
Jason Stevens  
Leandro Watanabe  
Michael Zhang  
Zhen Zhang  
Zach Zundel

## SynBioHub Developers

James A. McLaughlin  
Chris J. Myers  
Zach Zundel  
Göksel Misirli  
Michael Zhang  
Irina D. Ofiteru  
Angel Goñi-Moreno  
Anil Wipat

## SBOLDesigner Developers

Michael Zhang  
James A. McLaughlin  
Anil Wipat  
Chris Myers

The National Science Foundation under  
Grant No. CCF-1218095 and DBI-1356041.

The Engineering and Physical Sciences  
Research Council under grant EP/J02175X/1,  
EP/N031962/1, and EP/R019002/1.

