From Inspiration To Quantification

Jacob Beal

Panel on SASO systems - New research directions

IEEE SASO
September, 2012
From Spatial Computing To Biology

Distributed Power Demand Response

Morphogenetic Engineering

Spatial Computing

Synthetic Biology

device

neighborhood

GFP

LacI

F

IPTG

TetR

H

aTc

H

F

Extending Flippers

Larger Motor Driver

Larger Drive Motor

Extending Tracks
From Spatial Computing To Biology

Distributed Power Demand Response

How do you program space?

Spatial Computing

Morphogenetic Engineering

Synthetic Biology
How can millions of appliances coordinate to change how we use energy?

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How do you program the behavior of 10^{12} cells?

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Synthetic Biology

Spatial Computing
Scientific Progress in Engineering

- Inspiration
- Proof of Concept
- Application
- Analysis of Principles
- Theorems and Laws
- Modular Component
Scientific Progress in Engineering

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[Clement & Nagpal, ‘03]
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[Beal’06]

[Kondacs ’03]

[Basu et al. ’05]

[Butera ’02]

[Butera ‘02]
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[Beal et al. ’08]
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[Montagna et al. '12]
[Beal et al. '12]
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Most SASO research lives in these stages
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We need to move toward here

Fact is “when a statement [becomes] freed from the circumstances of its production”

– Bruno Latour