Rethinking:

Science and Technology Innovation

A Personal Perspective

James Martin 21st Century School, 12 March 2009

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Woodrow Wilson International Center for Scholars (in partnership with the Pew Charitable Trusts)

Communication
Coupling
Control

Communication

Coupling

Control

twitter

Select Language ...

What is Twitter?

What? | Why? | How?

Twitter is a service for friends, family, and co-workers to communicate and stay connected through the exchange of quick, frequent answers to one simple question: **What are you doing?**

Get Started—Join!

▶ Watch a video!

Please sign in

user name or email address:

password:

Remember me Sign In »

Forgot password? Click here.

Already using Twitter from your phone? Click here.

When I first started doing it, I thought, 'geez, not another website to worry about updating and checking', but now I'm glad I did it.

point_chevalier, livejournaller

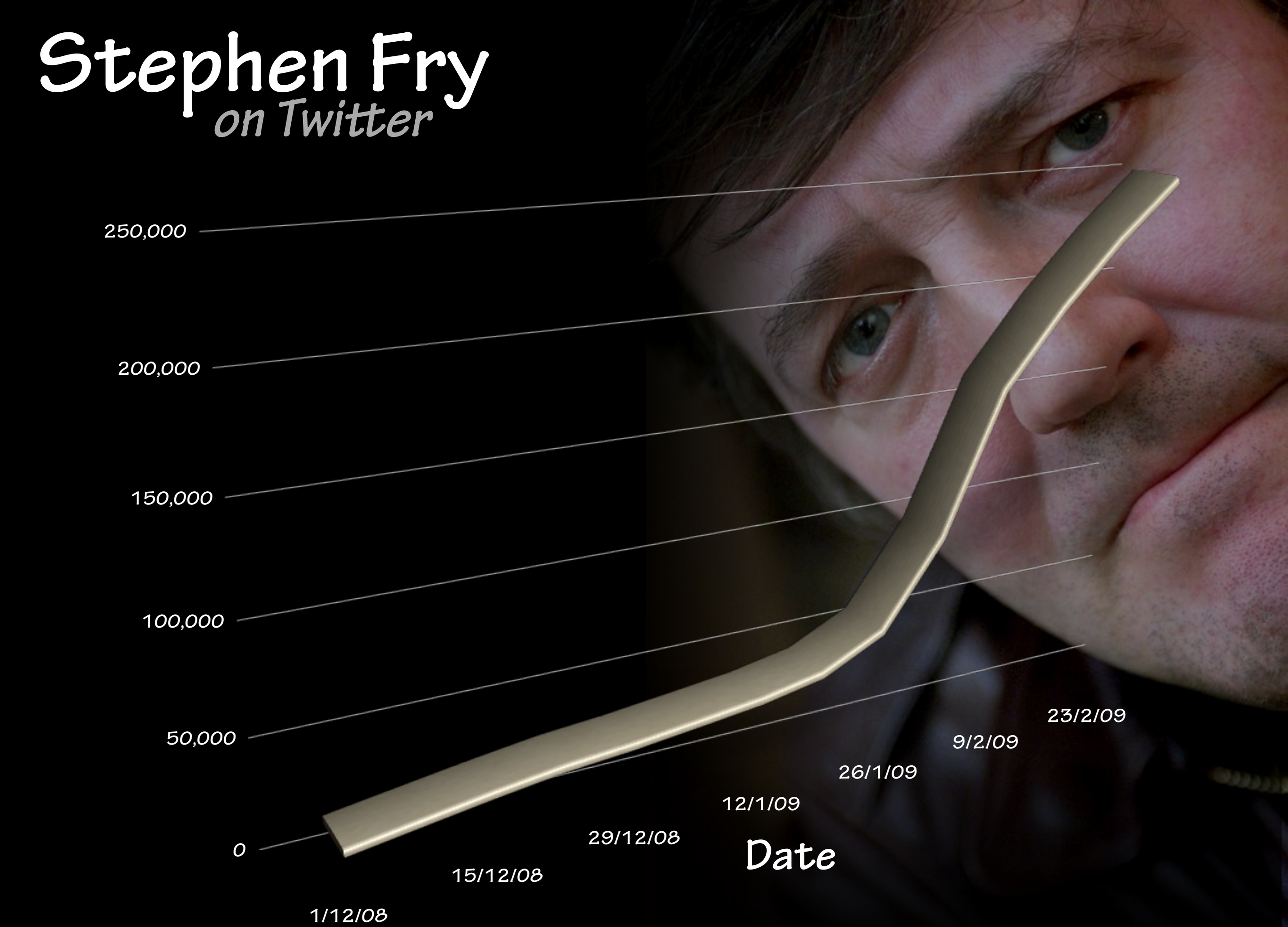
Twitter is the first thing on the web that I've been excited about in ages.

Jason Kottke, Blogger

Incredibly useful

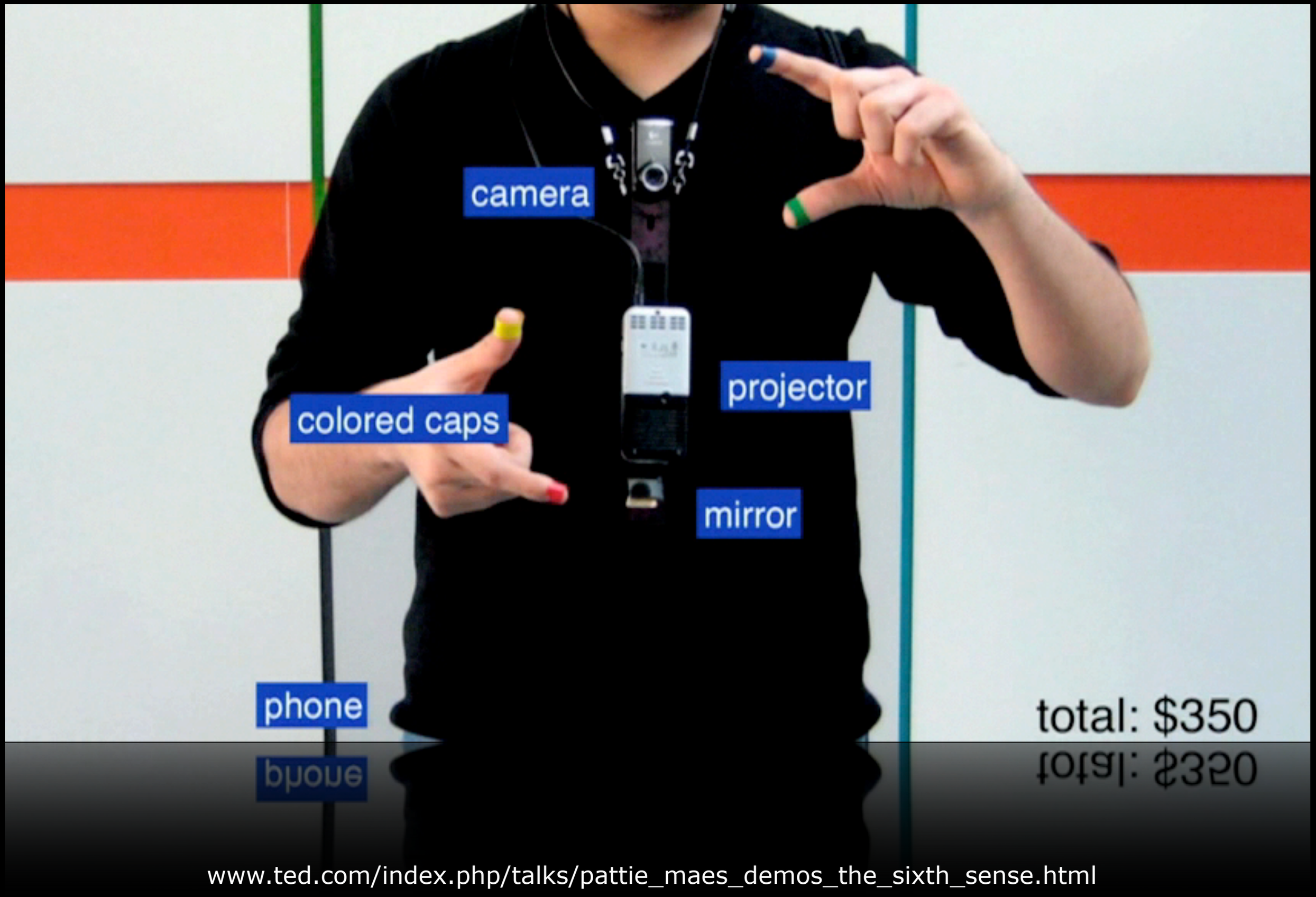
Wired

Stephen Fry
on Twitter



www.twitter.com/stephenfry

Pranav Mistry, Sixth Sense project, MIT Media Lab

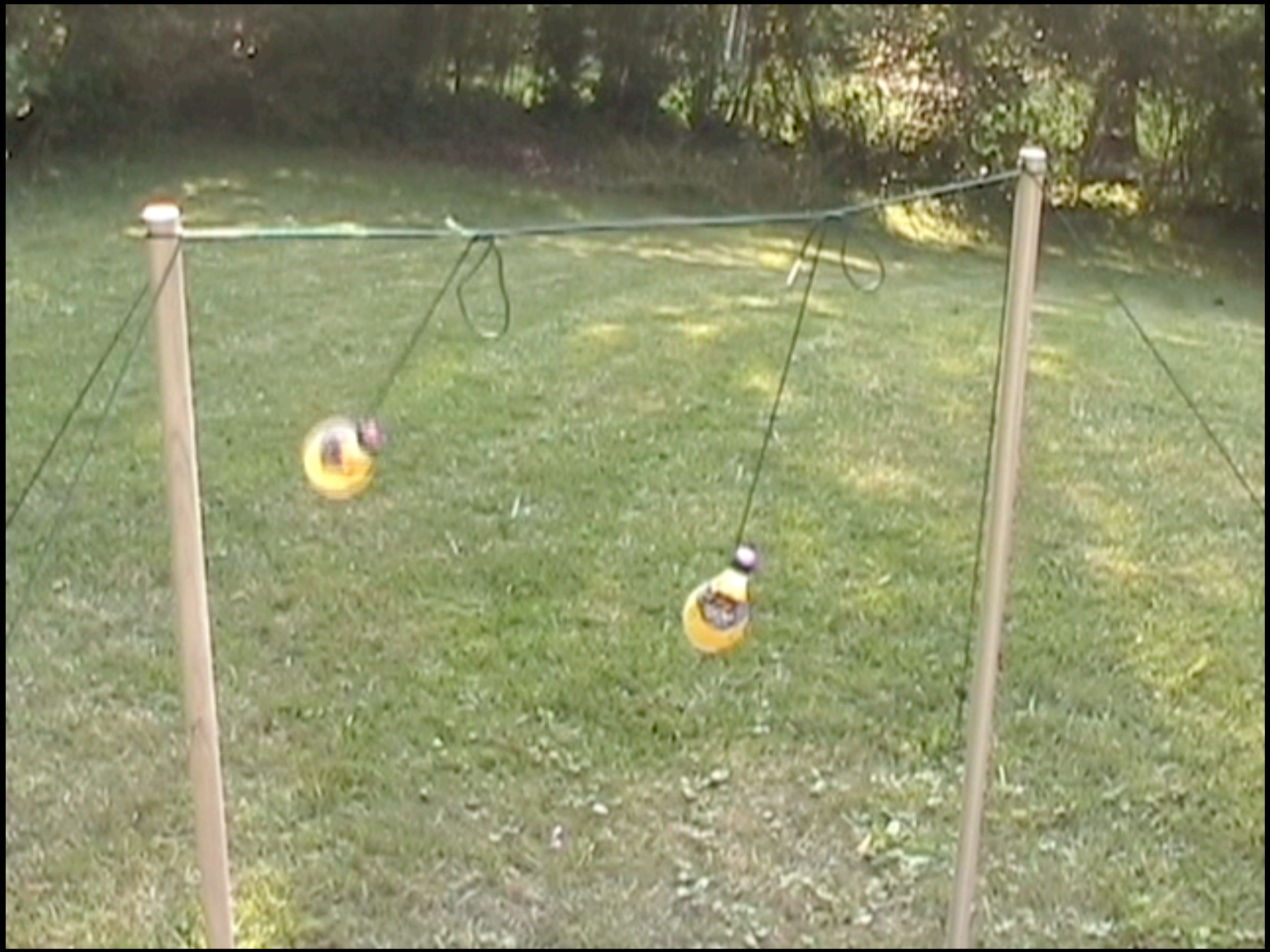


www.ted.com/index.php/talks/pattie_maes_demos_the_sixth_sense.html

Communication

Coupling

Control



Communication

Coupling

Control

Dr Roger Angel, University of Arizona

Small

Gets you to new places

Small

Silver

Small

Suffocated bugs

Sweet feet

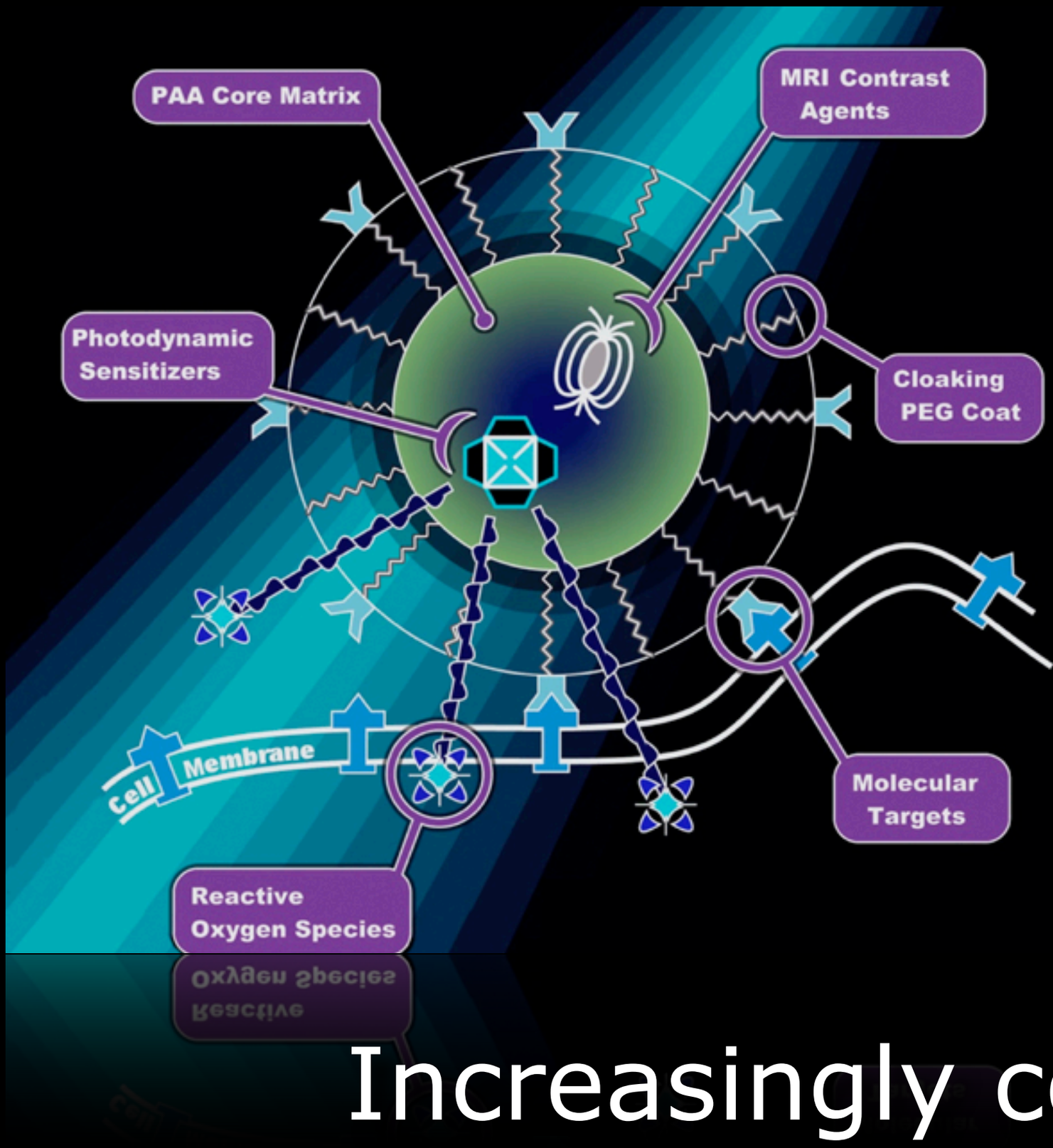
Gets you to new places

Strange

Lycurgus Cup

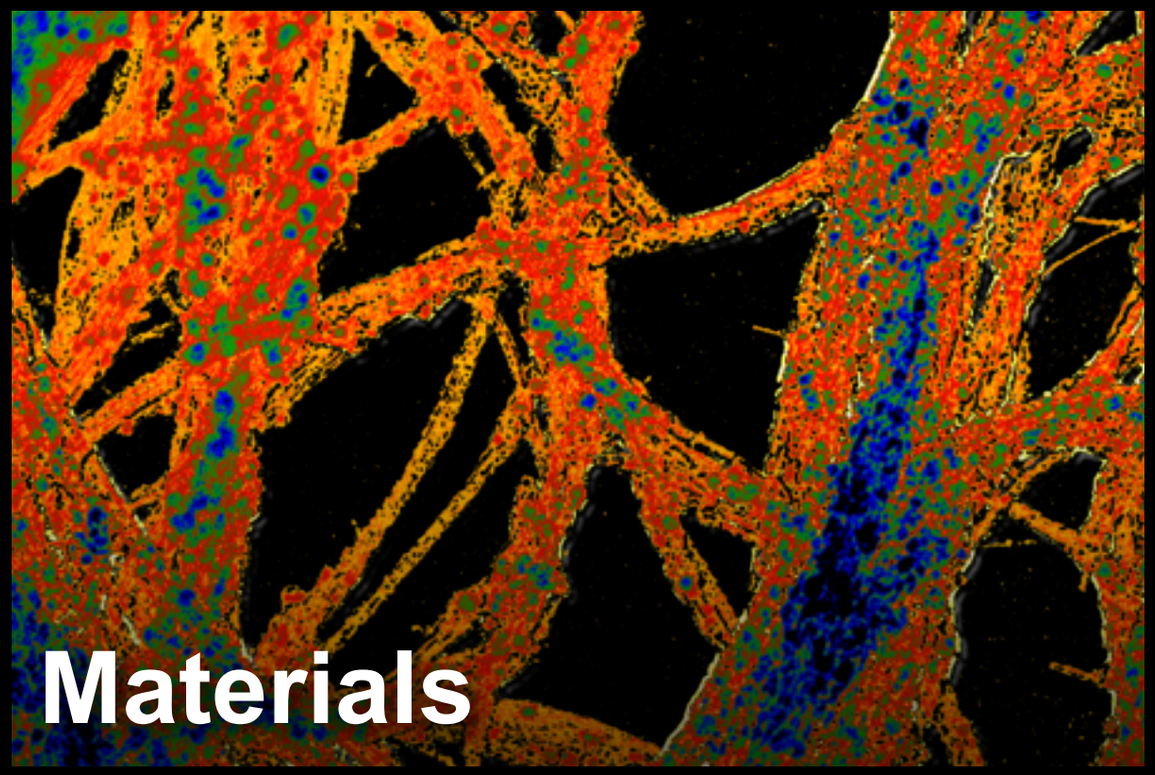
Behaves unexpectedly

Sophisticated

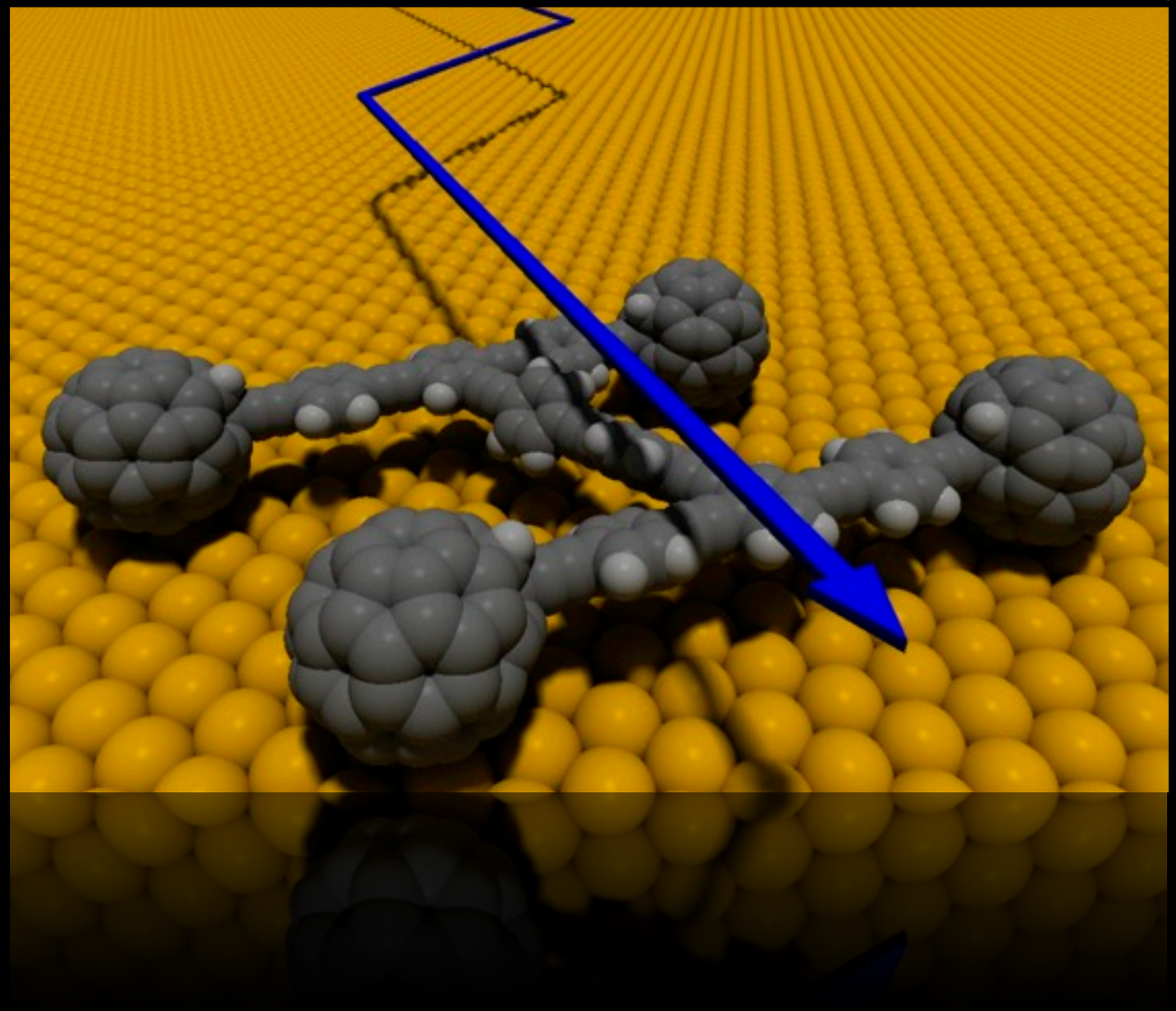


Increasingly complex

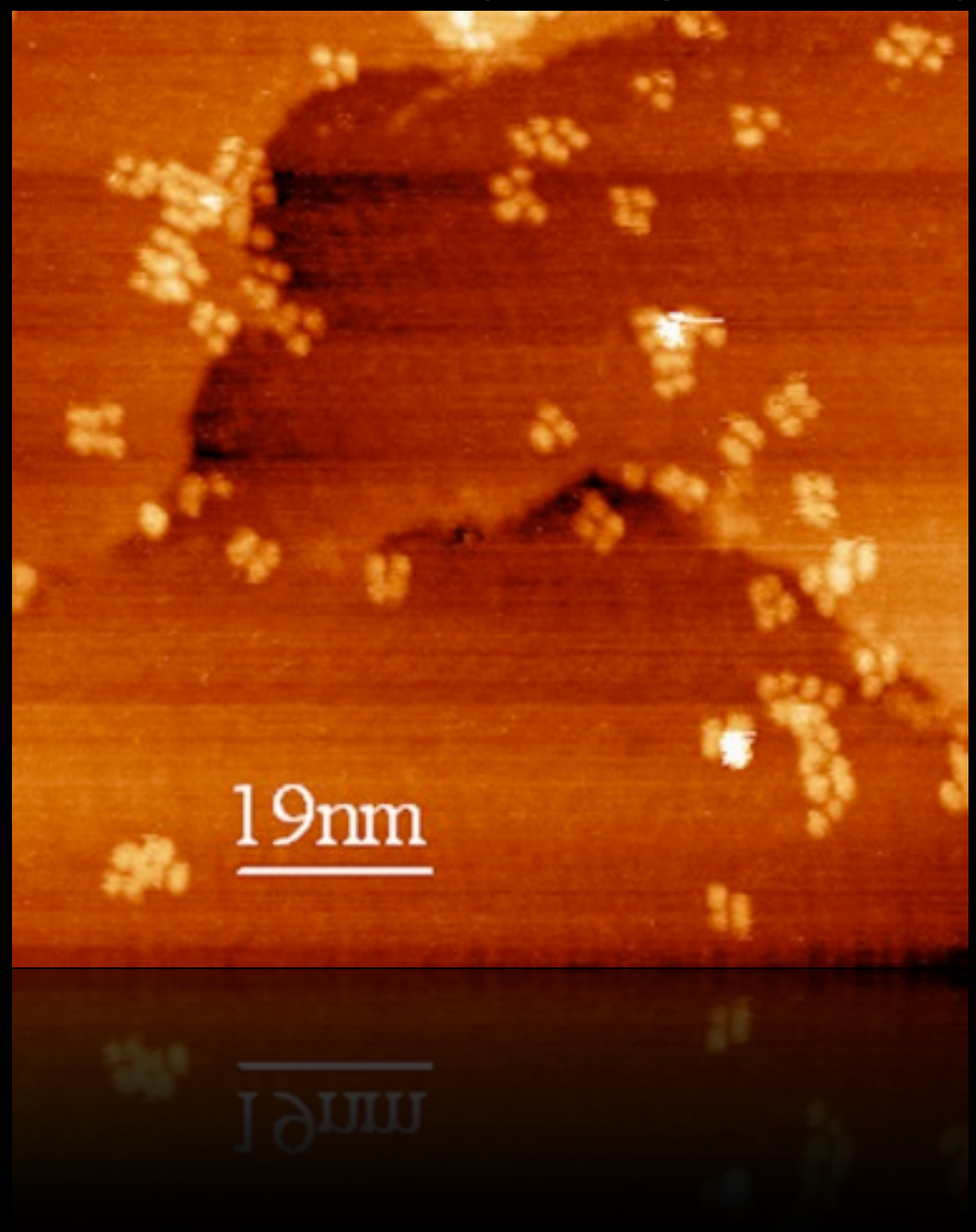
Nanoscale control:
Solutions to problems



Y. Shirai/Rice University



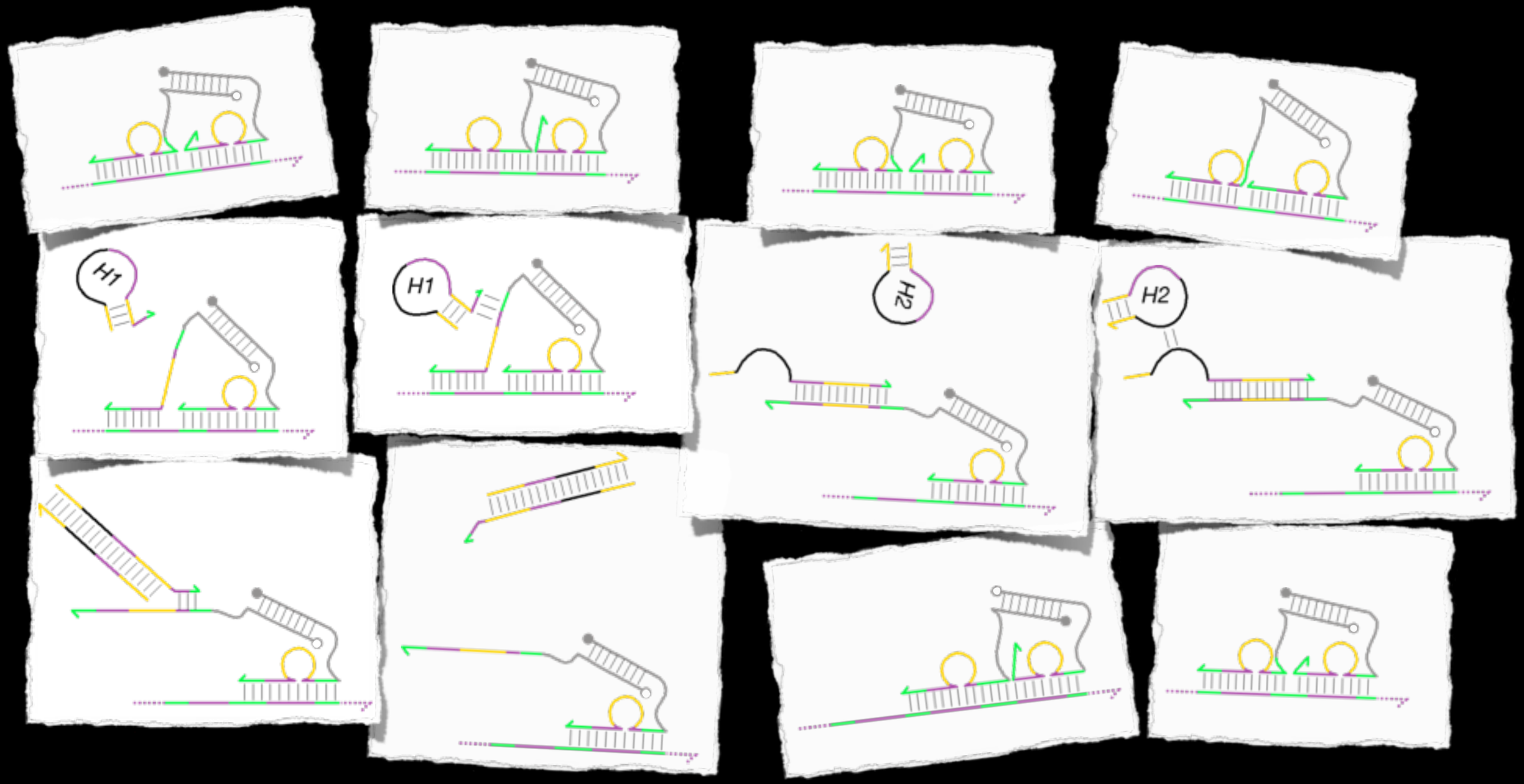
K. Kelly and A. Osgood/Rice University



Shirai, Y., A. J. Osgood, Y. Zhao, K. F. Kelly and J. M. Tour (2005). Directional Control in Thermally Driven Single-Molecule Nanocars. Nano Lett. 5(11): 2330-2334.

Graphics courtesy of Andrew Tuberfield Bionanotechnology IRC, Oxford University

A synthetic molecular motor



J. Green, J. Bath, and A. J. Turberfield (2008) Coordinated Chemomechanical Cycles: A Mechanism for Autonomous Molecular Motion. *Phys Rev. Lett.* **101**, DOI: 10.1103/PhysRevLett.101.238101

Re-arrange

Write

Debug

DIGITAL CODE

DIGITAL DOMAIN

Sequencing

Synthesis

DNA

PHYSICAL DOMAIN

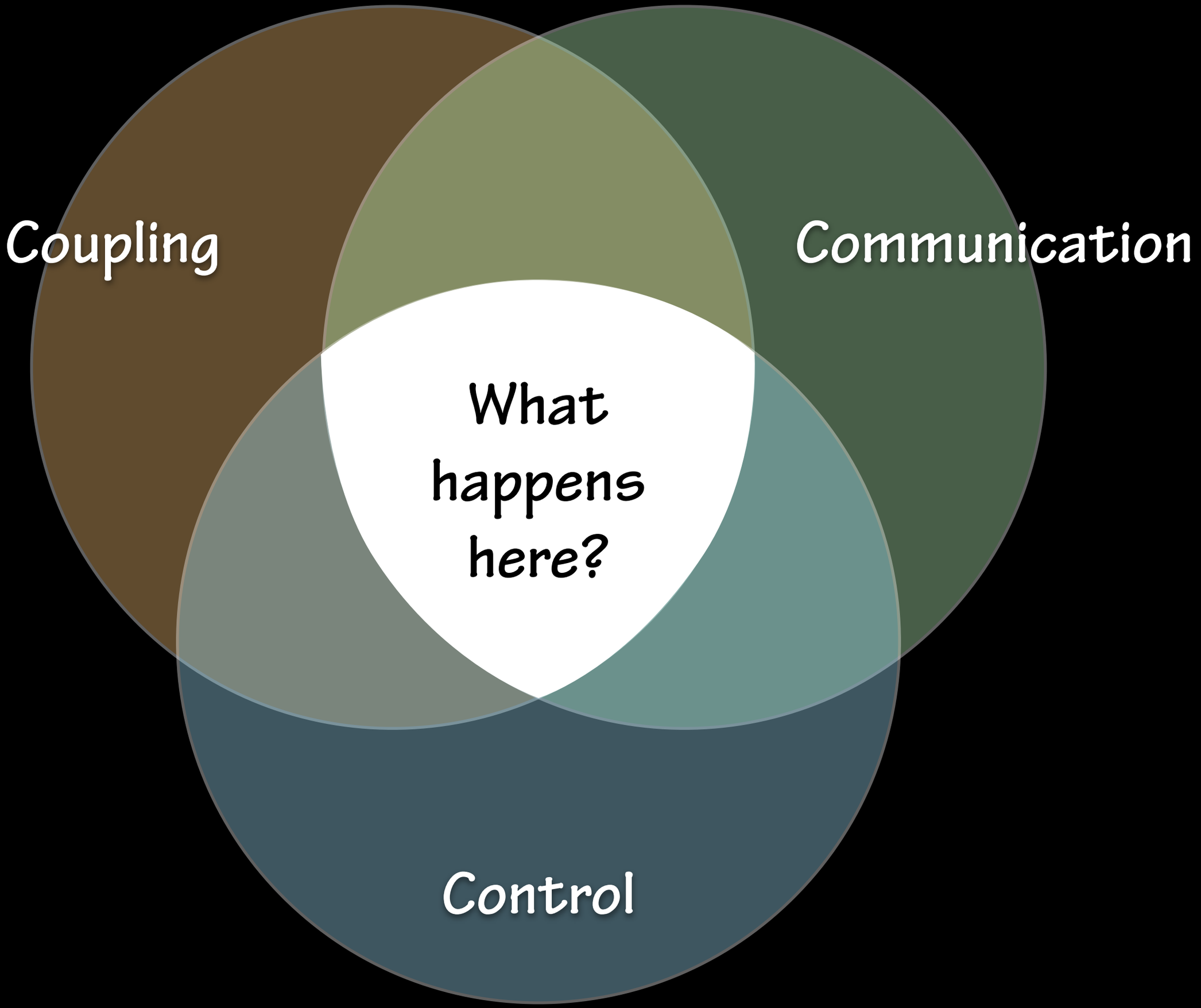
Natural Selection

Breeding

Biotechnology

Information Flow

Concept: Drew Endy


Coupling
Communication
What happens here?
Control

Goals

Funding

Mechanisms

Science & Technology

Security

Innovation

Jobs

Wealth

Quality of Life

Policy

...a simplistic perspective...

Funding

Goals

Mechanisms

Review

Science & Technology

Participation

Innovation

Security

Quality of Life

Wealth

Jobs

Policy

Empower:
Stakeholders

For lay stakeholders

- Foster critical thinking
- Ensure knowledge is accessible
- Convey consequences of actions

For expert stakeholders

- Learn to communicate
- Learn to listen

Engage:
Stakeholders

For lay and expert stakeholders

- Public discourse
- Participation in decision-making
- Integrate science into society
- Build constituencies

Re-Evaluate:
Drivers, Mechanisms, Policies

For policy makers and funders

- Challenge-informed science
- New knowledge stimulation
- Knowledge coupling

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