

Risk and responsible innovation & governance: Lessons from societal research on nanotechnologies

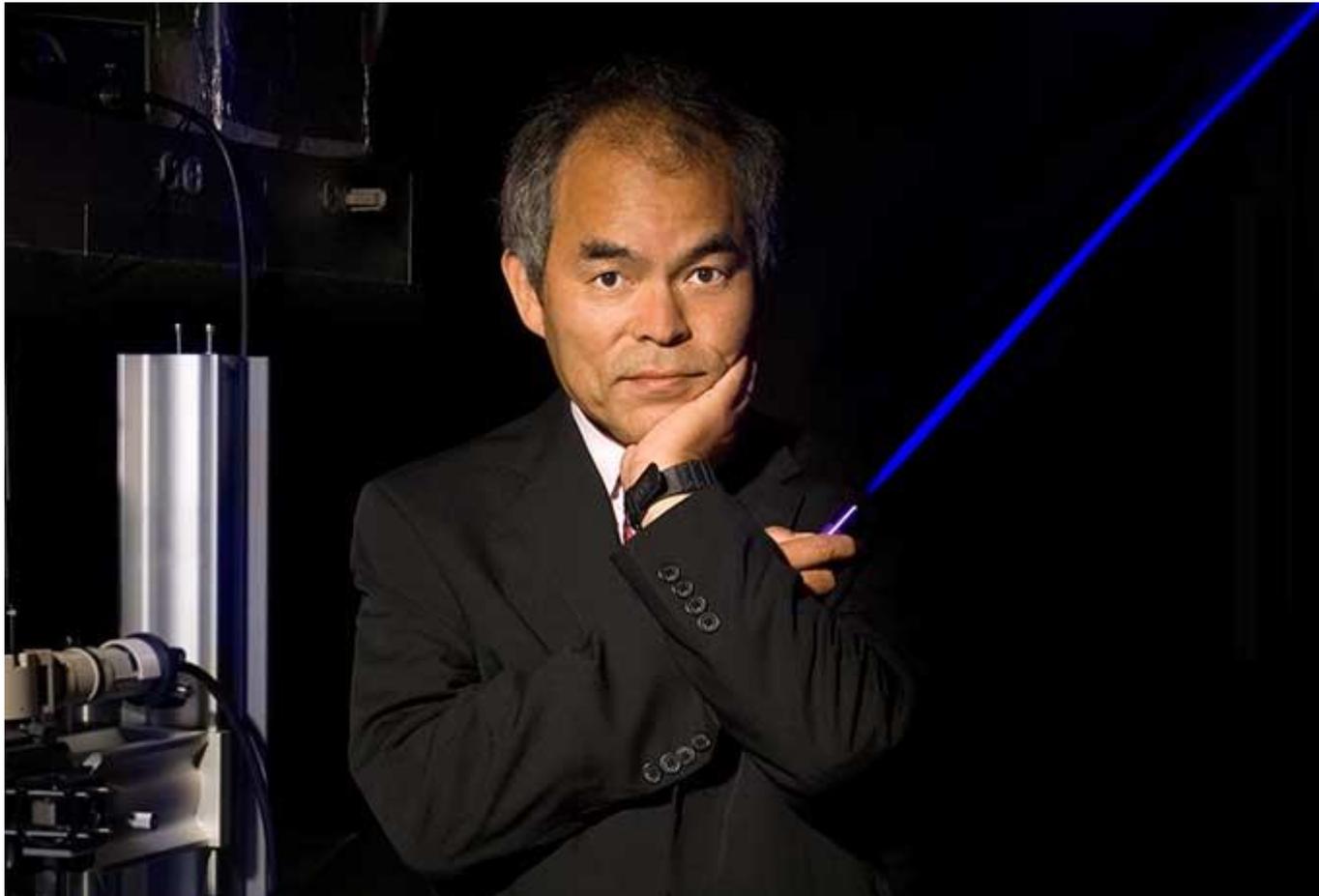
Barbara Herr Harthorn

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Implications of Nano



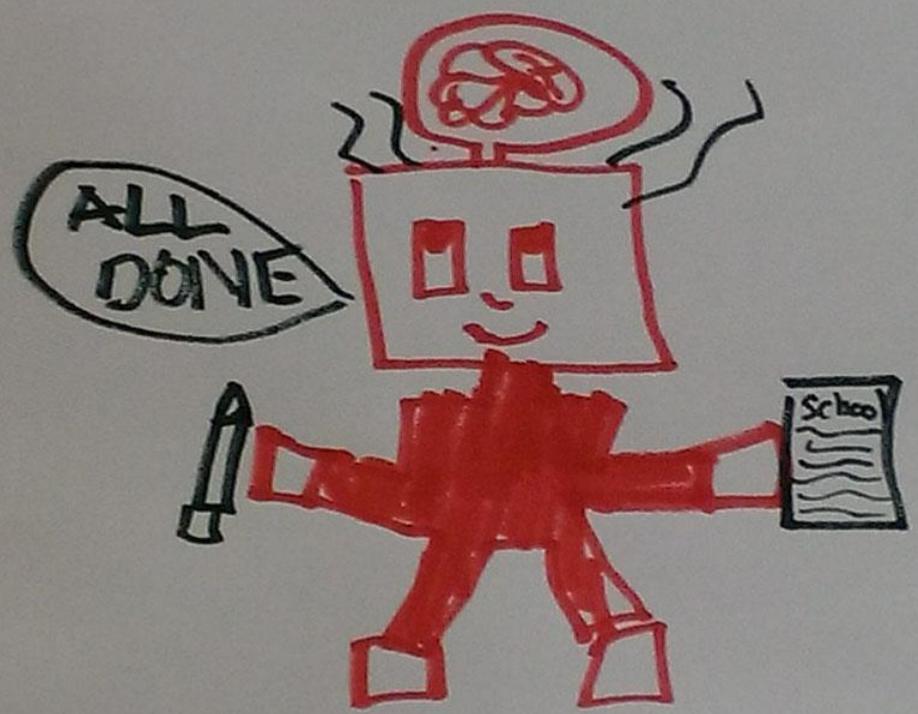
SES 0938099

UCSB's Shuji Nakamura wins Nobel Prize in physics 2014



Credit: Randall Lamb
UCSB Public Affairs & Comm

My Robot!



My robot's name is Brain
Its job is to do any type of work
It could change my life by doing anything for
me also my job FOR FREE!

UCSB Nano Days
April 2014
Santa Barbara Natural
History Museum



New Technologies in Society?

- 
- Who benefits? What kind of benefits?
 - who is harmed?
 - who decides?
 - what are the risks?
 - will there be unanticipated consequences?
 - what are alternatives and are they being considered?
 - who's responsible/in control and are they trustworthy and competent?
 - [and how will those billions around the globe be affected?]

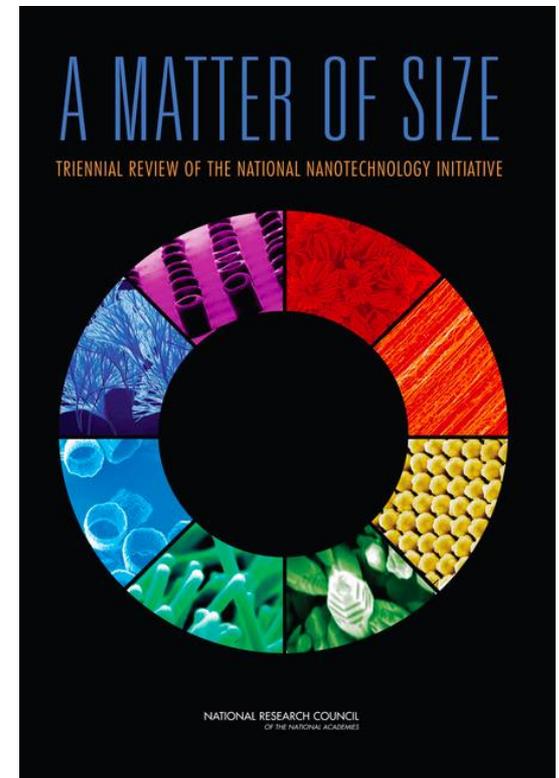
(source: Stilgoe in Owens, Bessant & Heintz 2013)

Value of Societal Work to the National Nanotech Initiative

1- Responsible Development

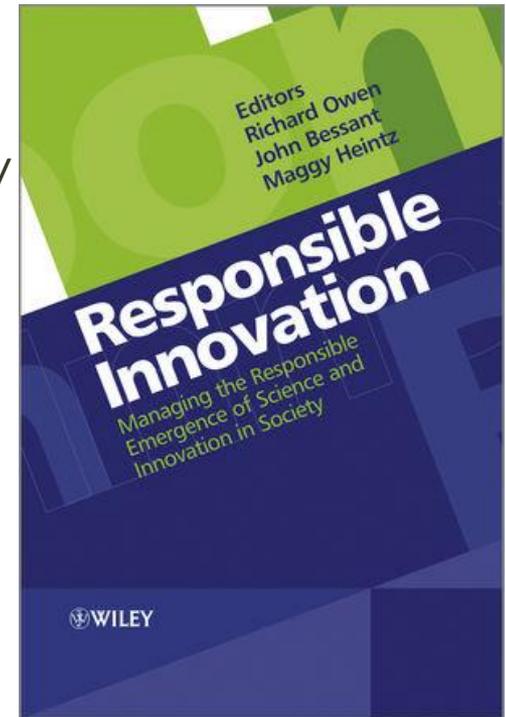
- “Develop and use technology to help meet the most pressing human and societal needs”
- “Make every reasonable effort to anticipate and mitigate adverse implications or unintended consequences”

(source: NAS 2006 review of NNI)



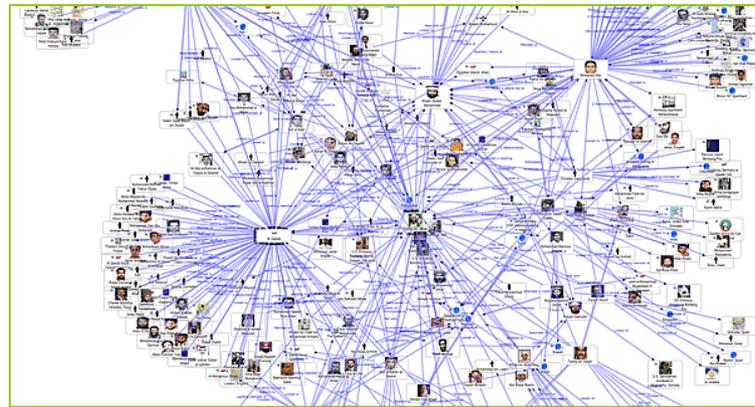
2 - Responsible Innovation

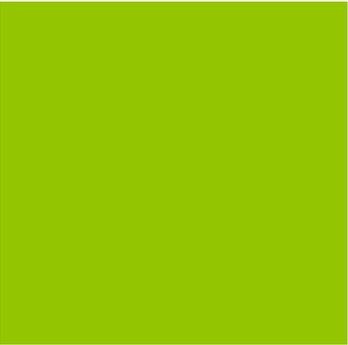
- public/societal not just economic benefit
- research aimed at equitable development
- solving the world's problems (Grand challenges)
- activities to improve/ 'nudge' toward responsibility (cf. Sunstein)
- governance (anticipation/foresight) (*not* regulation)
- new forms of public engagement
- interdisciplinary collaboration
- counter a 'narrative of inevitability'
- new tools/welded to new approach



Analytic/Deliberative approach

- Not just quant. risk estimation
- Risk (and Benefit) Perception
- Public participation
- Integration of multiple stakeholder concerns
- Responsible risk communication
- Reflexivity, collaboration





Societal work in the NNI: *necessary and productive*

- Normative - right thing to do
- Utility – useful thing to do
 - Instrumental
 - Substantive



Normative value

- Experimental engagement/inclusion—Democratizing Technologies conf.
- Engaging the ‘uninvited’ publics about new technologies, development, and NGOs



<http://www.cns.ucsb.edu/demtech2014/welcome>

DEMOCRATIZING TECHNOLOGIES

Assessing the roles of NGOs in shaping technological futures

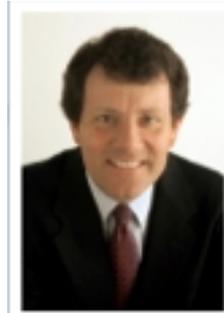
CNS~UCSB
Center for Nanotechnology in Society

NOV 13-15 2014

University of California, Santa Barbara

- High risk experimental public engagement activity
- 2 local NGOs as lead partners; 26 campus co-sponsors from all parts of campus
- 92 invited participants
- ~ 150 participants
- 28 NGOs (31 NGOs reps)
- 11 countries represented from Latin America, Africa, Europe & Asia as well as N. America

Keynote Speaker



Nicholas Kristof

Pulitzer Prize-winning NYT Columnist

What they liked

- “I thought the conference was superb. It brought together a very interesting group of people - highly intelligent practitioners from the NGO world and extremely interesting and methodologically sound academics, all pushing forward on important policy issues. I particularly appreciated the geographic range of the speakers and therefore the breadth of perspectives presented, and the empirically grounded cross-disciplinary approach.” (faculty participant)



Normative value: Ex. 2

- Research on how to include the disenfranchised – Harthorn group
- Mixed social science methods for more robust findings
- Deliberative workshops, in the US and UK, 2007, 2009, 2014
- Surveys in the US 2008, 2010, 2012, 2013
- Publications on the reasons for (some) public ambivalence about new technologies, vulnerability and risk perception, environmental risk perception, the 'white male' effect, etc.

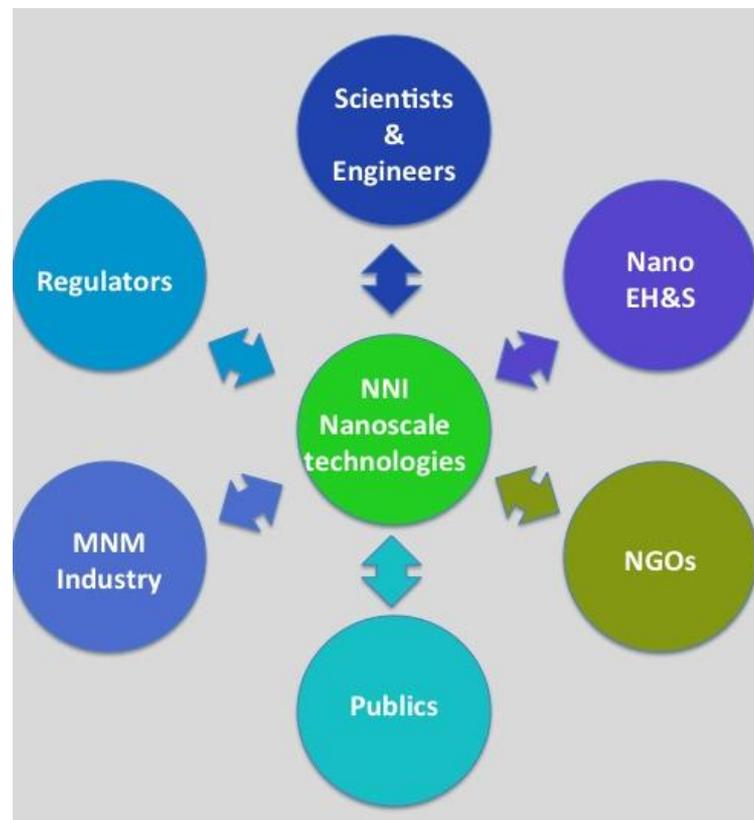
Utility value 1

- understand innovation system effects in comparative global framework (IRG 2)
- better understand the importance of state policies and international collaboration in fostering nanotechnology R&D and commercialization, and in contributing to more sustainable and equitable development, through a comparative study of the U.S., China, Japan, India, Korea, and selected Latin American countries.

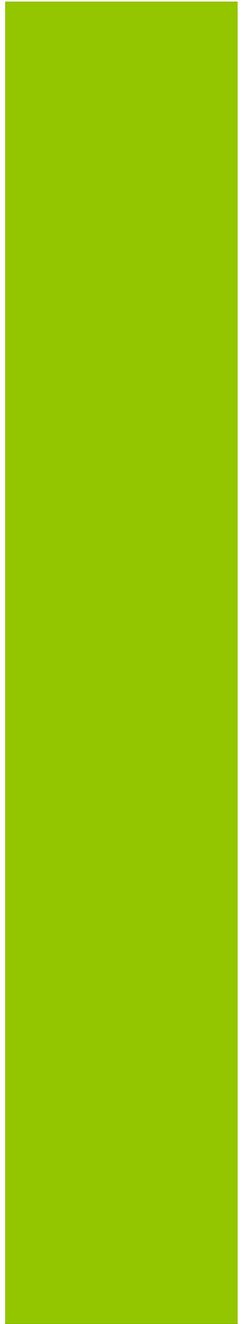


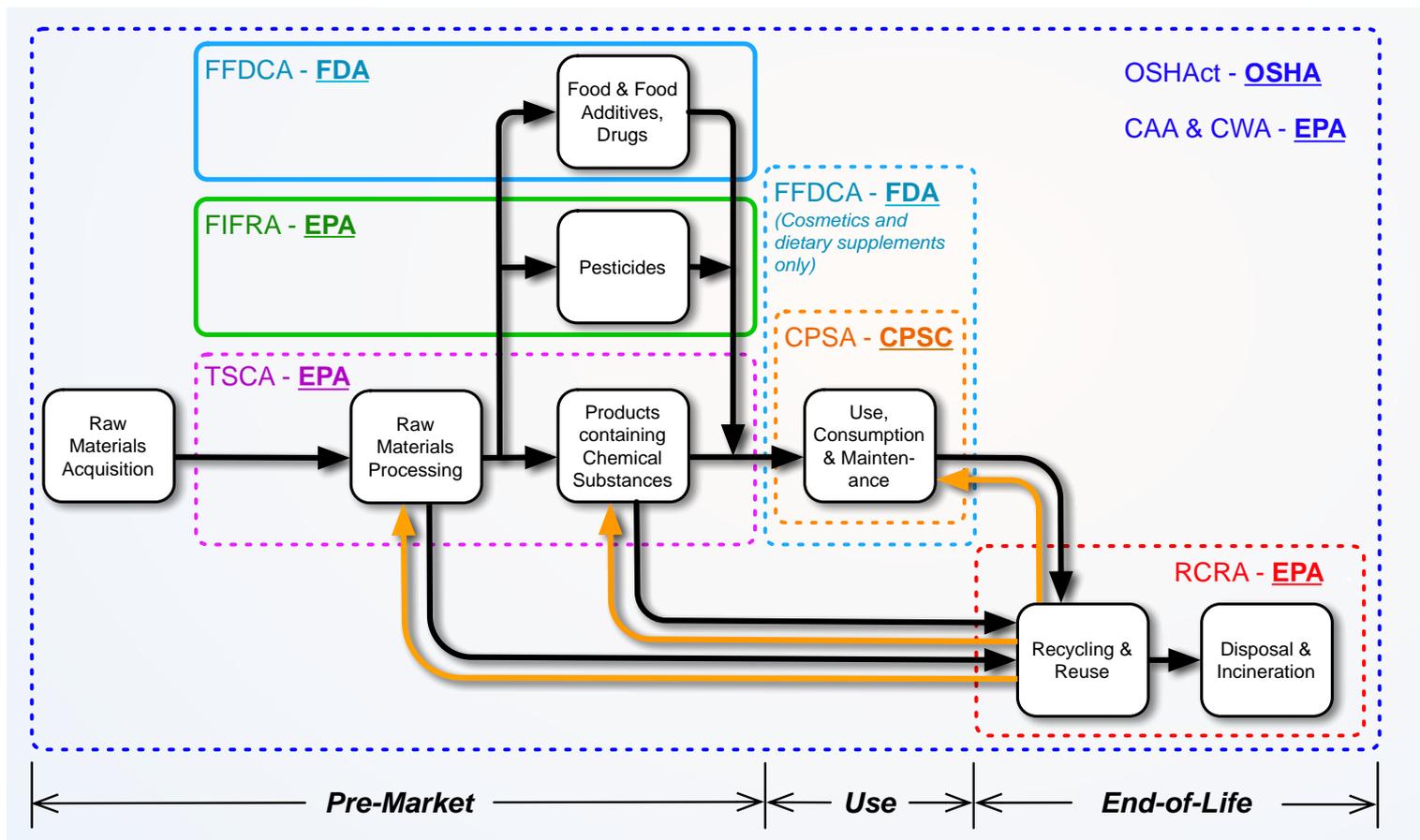
Utility value 2

- Evidence-based approach to understanding expert and public views (IRG 3)



Most
challenging?
Integration



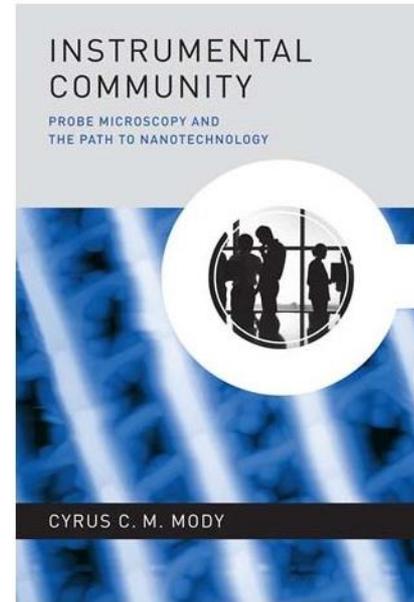


Beaudrie, Kandlikar, & Satterfield (2013). From Cradle-to-Grave at the Nanoscale: Gaps in US Regulatory Oversight along the Nanomaterial Life Cycle, ES&T 47: 5524-5534.

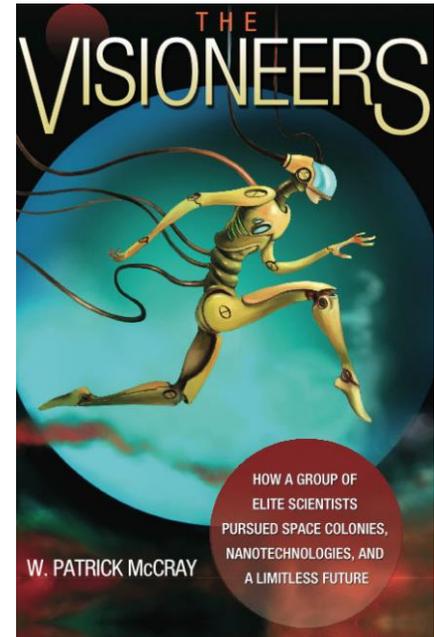
Applied histories of S&T → “Usable past”



IRG-1 research cited in Marina Mazzucato's work on innovation & the federal government



2011 Cushing Prize & 2014 Paul Bunge Prize



**2012 Eugene M. Emme Prize
2014 HSS Prize**



Presidential Commission for the Study of Bioethical Issues

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the University of California, Santa Barbara. Dr. Harthorn leads an international and interdisciplinary team



[Click here](#) for Technical Support Information

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Center for Environmental Implications of Nanotechnology

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People at UC CEIN

UC CEIN has emerged as a multidisciplinary Center in which interactions between nanomaterial scientists, chemists, biologists, toxicologists, engineers, computer scientists, ecologists, legal scholars, public health specialists and social scientists have grown into a productive enterprise in which the synergistic work product is a reflection of critical mass and combined expertise that is not accomplishable by single investigators.



[Jorge Gardea-Torresdey, Ph.D.](#)
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 Theme 4



[Hilary Godwin*, Ph.D. \(Co-PI\)](#)
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[Mark Hersam, Ph.D.](#)
 Professor of Materials Science and Engineering
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 Theme 1



[Patricia Holden*, Ph.D. \(Co-PI\)](#)
 Professor of Environmental Microbiology
 University of California, Santa Barbara
 Theme 4



Engagement via social and traditional media

China: Innovator or Follower?

Written by Richard P. Appelbaum.

In 2006, continuing its effort to achieve world-class status as an S&T innovator, the Chinese government launched its National Medium- and Long-Term Plan (MLP) for the Development of Science and Technology 2006-2020, making "indigenous innovation" its top developmental priority. China's emphasis on indigenous innovation positions the Chinese state as a key driver of economic development. This represents a strong form of industrial policy,[i] in which key areas of basic science, applied engineering, and industrial



- Leaping Robot and STEM Equity blogs; >45,000 visits last year



Generating value—normative and utility—to the NNI (and S&E)

- NNI's support of societal research at CNS-UCSB has generated new knowledge about the global innovation system and policy, upstream perceptions and attitudes of experts & publics, and the historical specificities of the enterprise
- Innovated new mechanisms for integration of science/society
- Developed new partnerships, collaborations, international/global scope
- Fostered a new generation of societal and societal-minded S&E workforce

