NIST USER FACILITIES

Center for Nanoscale Science and Technology
NIST Center for Neutron Research

Rob Dimeo, *Director*
NIST Center for Neutron Research

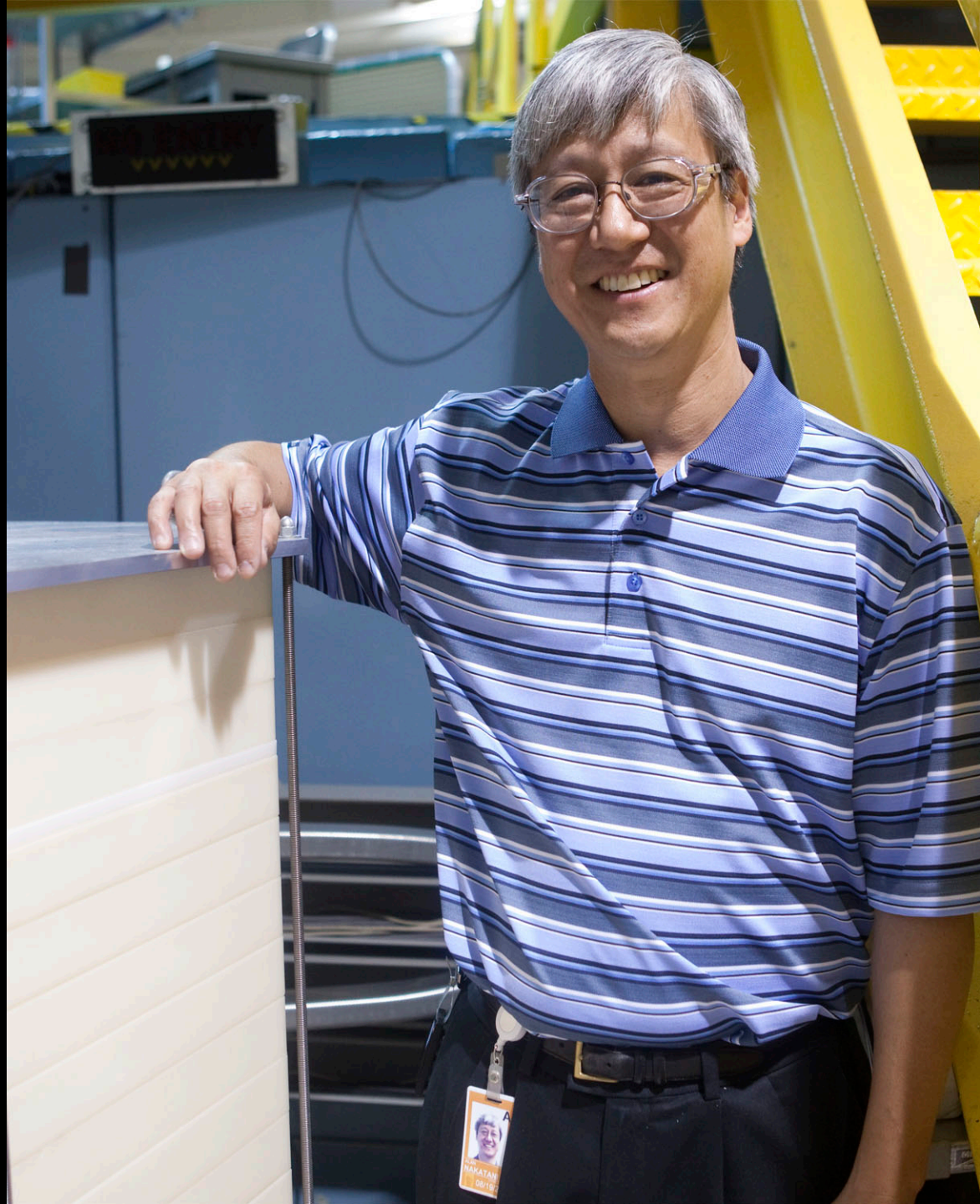
photo courtesy HDR Architecture, Inc./Steve Hall Copyright Hedrich Blessing

access

capabilities

intellectual property

support



CNST

Center for Nanoscale Science and Technology

The CNST supports the U.S. nanotechnology enterprise from discovery to production by providing industry, academia, NIST, and other government agencies with access to world-class nanoscale measurement and fabrication methods and technology.

by the numbers

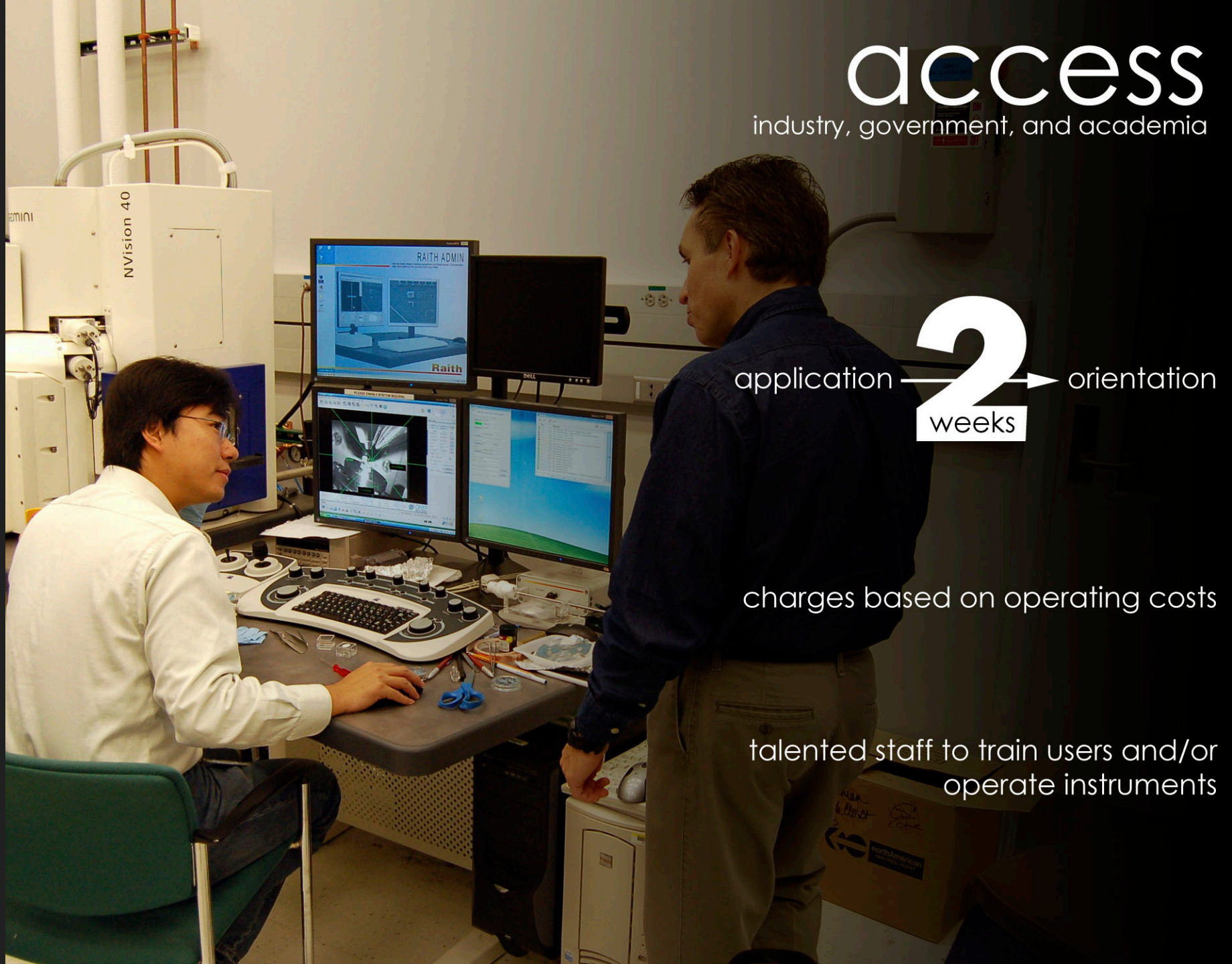
60000 ft^2 total of labs and cleanroom

8000 ft^2 class 100 cleanroom space

240+ years of process development experience

CNST NanoFab

CNST NanoFab



access

industry, government, and academia

application → 2 weeks → orientation

charges based on operating costs

talented staff to train users and/or operate instruments

CNST Research

Creating the next generation of nanoscale measurement tools

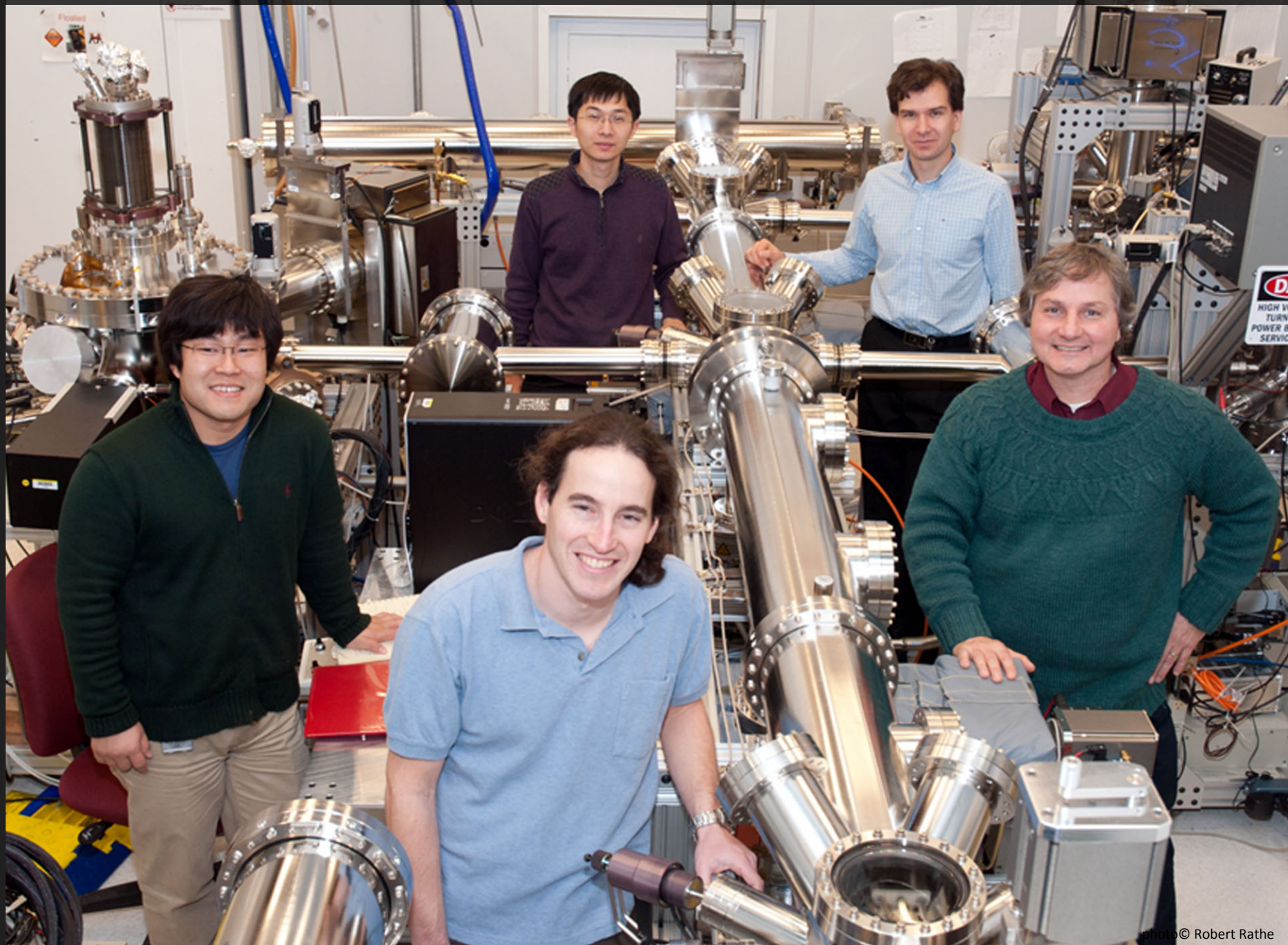
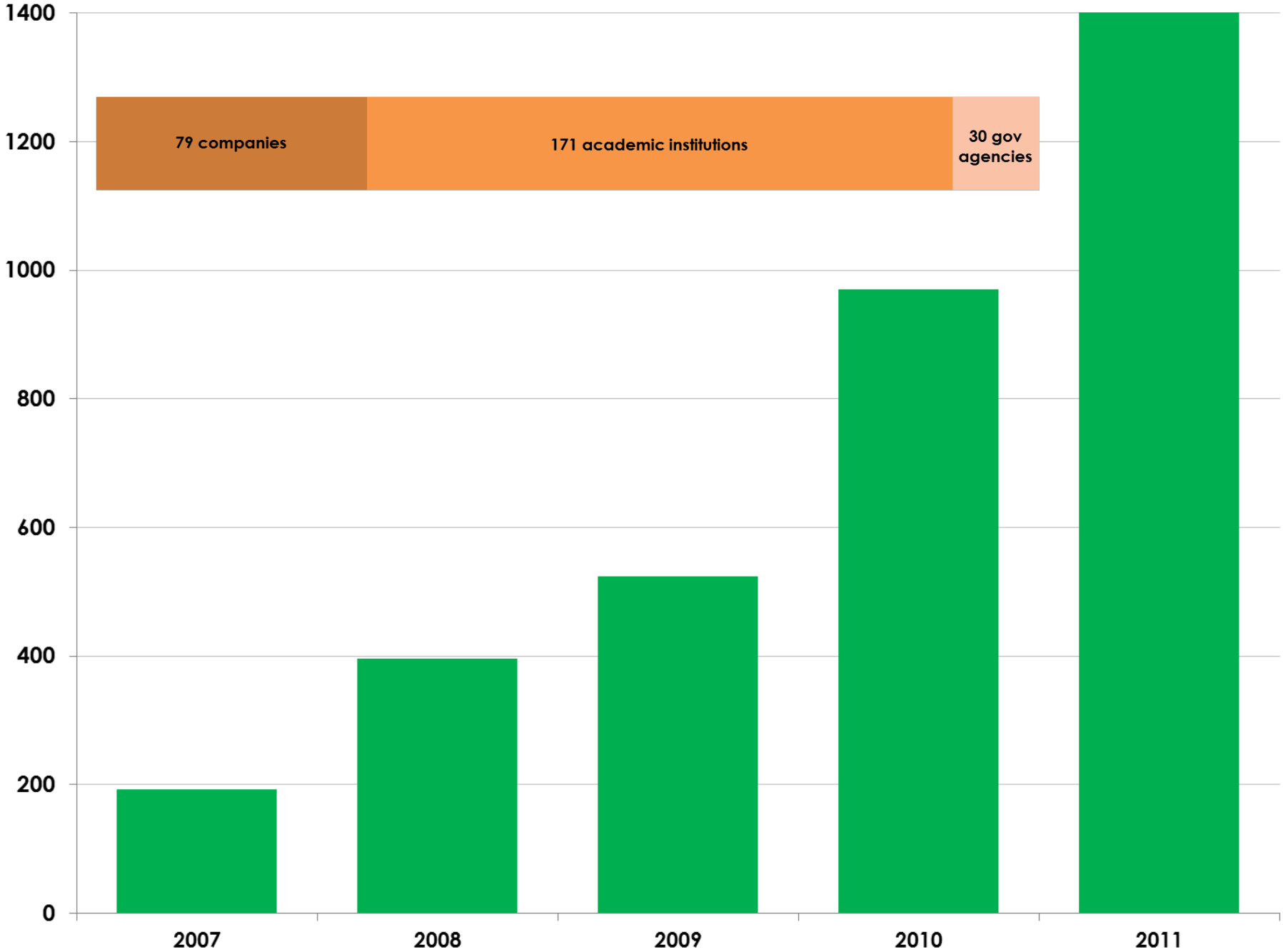


photo © Robert Rathe

CNST

Research Participants



CNST

MGH Center for Systems Biology

Jered Haun

Ralph Weissleder

$$\frac{1}{10^9}$$

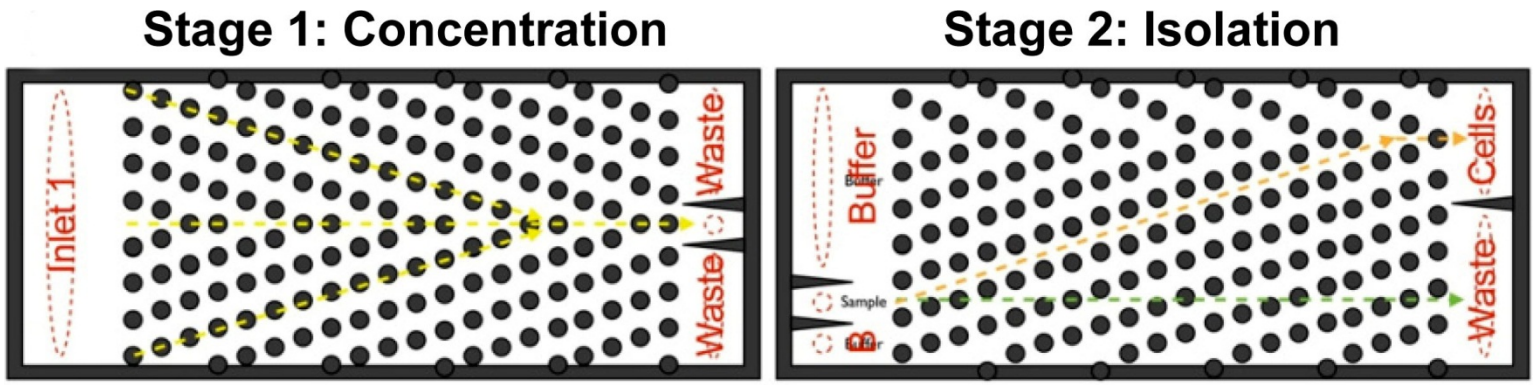
needle
(CTC 12μm)

haystack
(1ml whole blood)

CNST

Chip-based cell-sorter

…to reliably and repeatedly sort needles from a haystack



Jered Haun

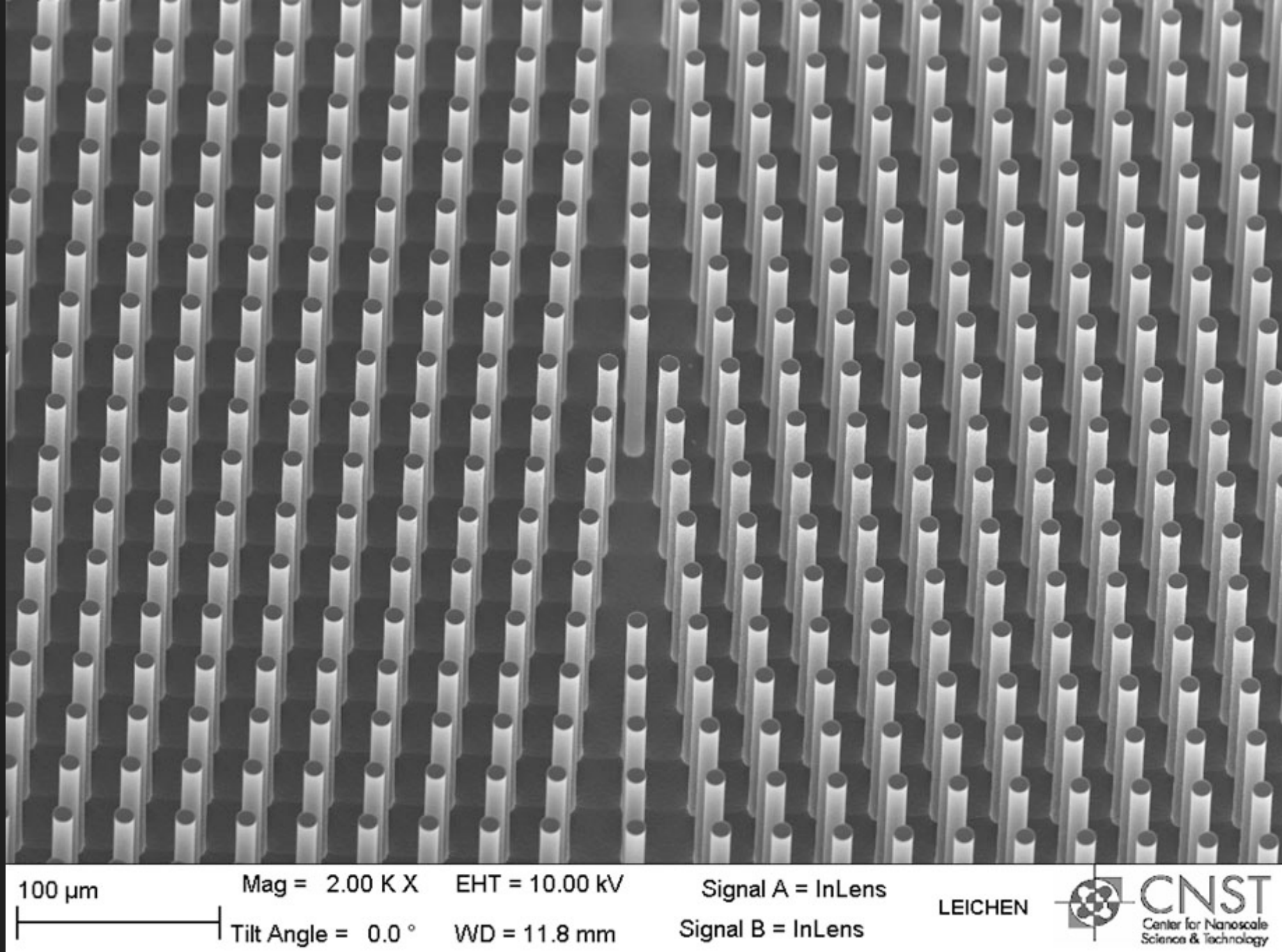
nanofab manager

Vince Luciani

nanofab research group leader

Alex Liddle

CNST


100 µm
Mag = 2.00 K X
Tilt Angle = 0.0 °
EHT = 10.00 kV
WD = 11.8 mm
Signal A = InLens
Signal B = InLens
LEICHEN
CNST
Center for Nanoscale Science & Technology

CNST

“…my experience at the CNST was phenomenal. I was trained quickly, and it was clear that the priority on your end was to get me in the NanoFab and get my work completed as soon as possible.

-Jered Haun

100 µm
Mag = 2.00 K X
Tilt Angle = 0.0 °
EHT = 10.00 kV
WD = 11.8 mm
Signal A = InLens
Signal B = InLens
LEICHEN
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NCNR

NIST Center for Neutron Research

The mission of the NCNR is to assure the availability of neutron measurement capabilities to meet the needs of U.S. researchers from industry, university and Government agencies.

NCNR

by the numbers

20 MW test reactor

250 operating days/year (↑**38** ↓**11**)

2 proposal calls/year

400 proposals/call

2.5 oversubscription

NCNR

structure & dynamics of materials

talented instrument staff to help our users succeed

diverse sample environments

NCNR

access

industry, government,
and academia

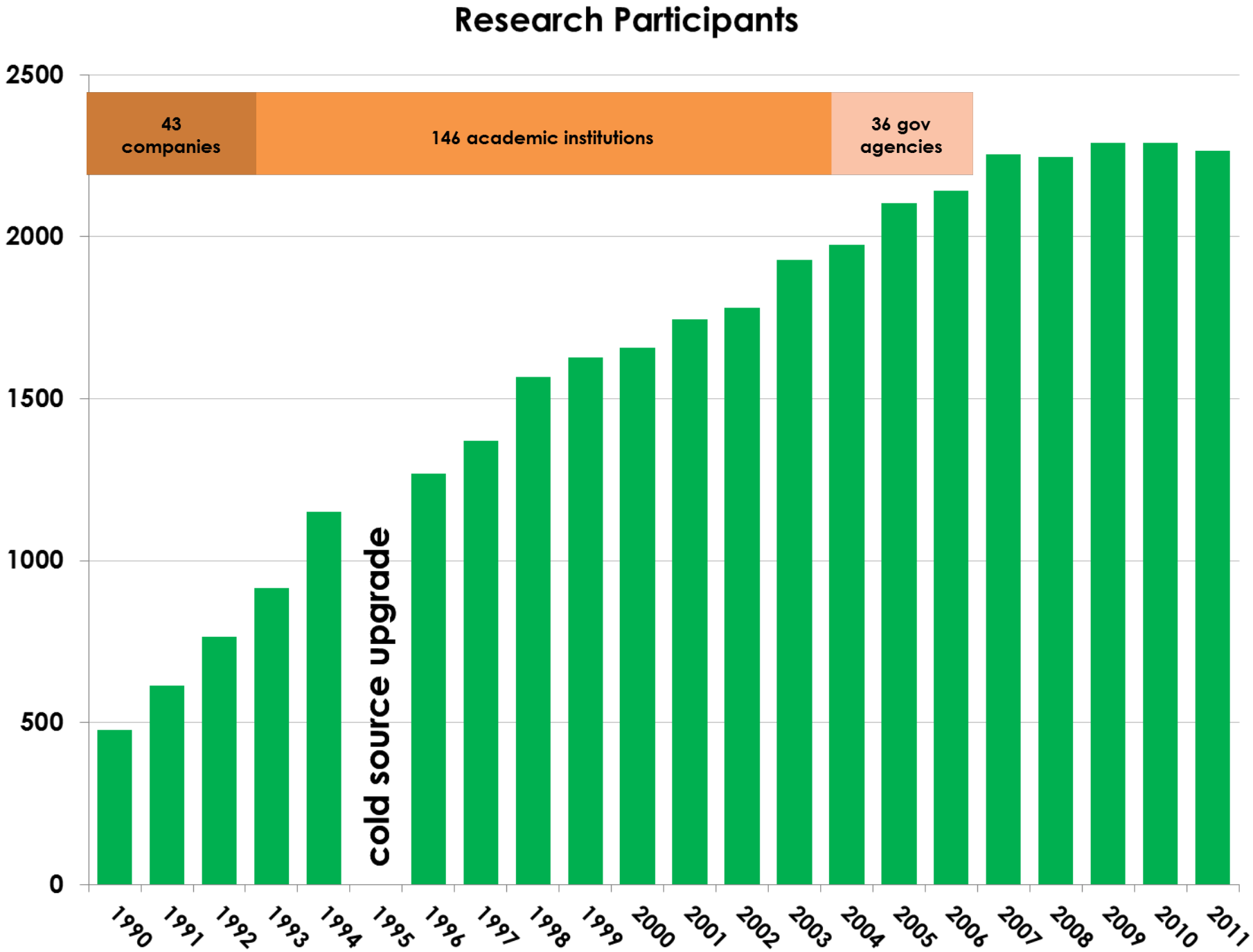
proposals

collaborative

partnerships

proprietary

NCNR


Research Participants
2500
2000
1500
1000
500
0
43 companies
146 academic institutions
36 gov agencies
cold source upgrade
1990
1991
1992
1993
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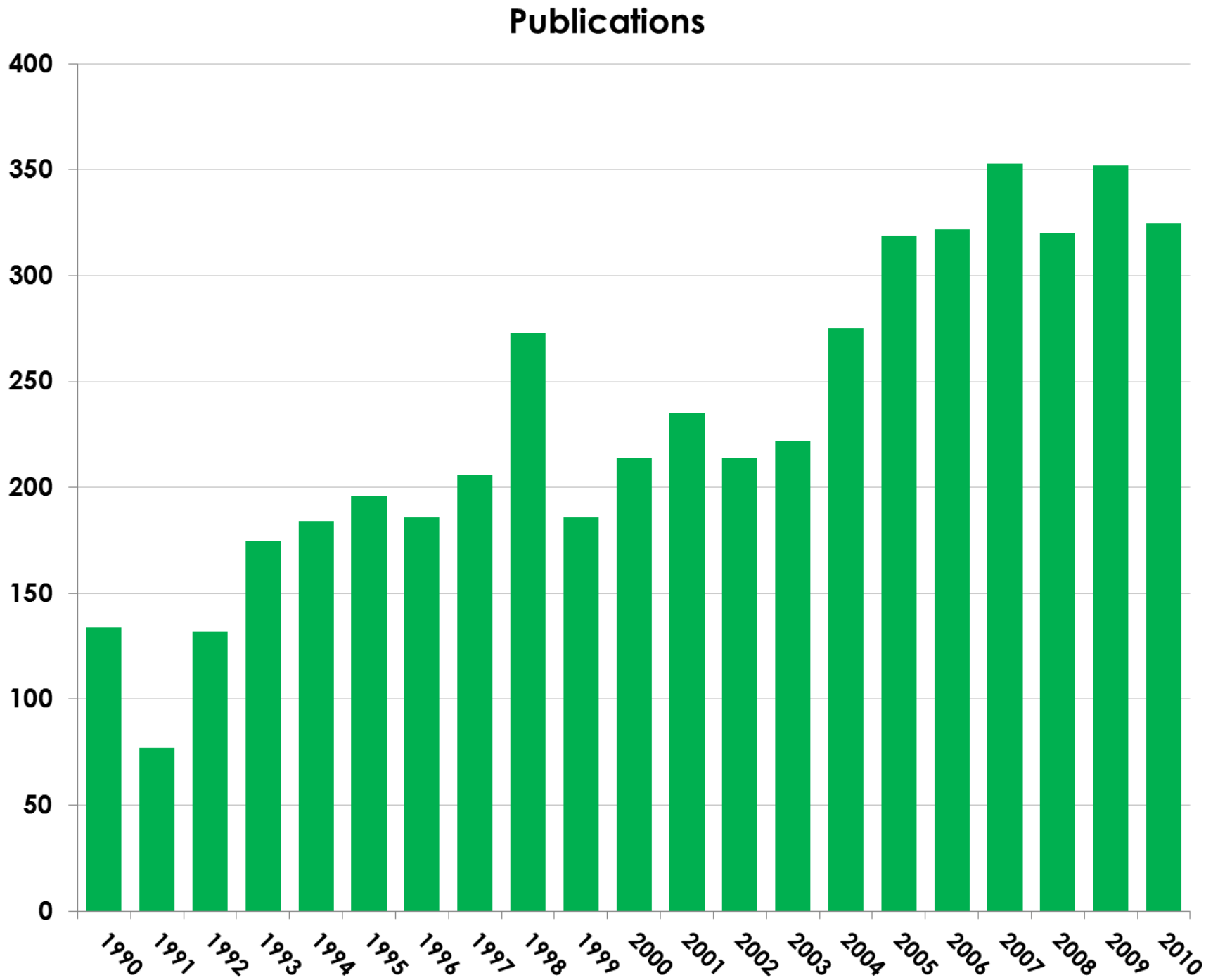
NCNR


Publications
400
350
300
250
200
150
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1990
1991
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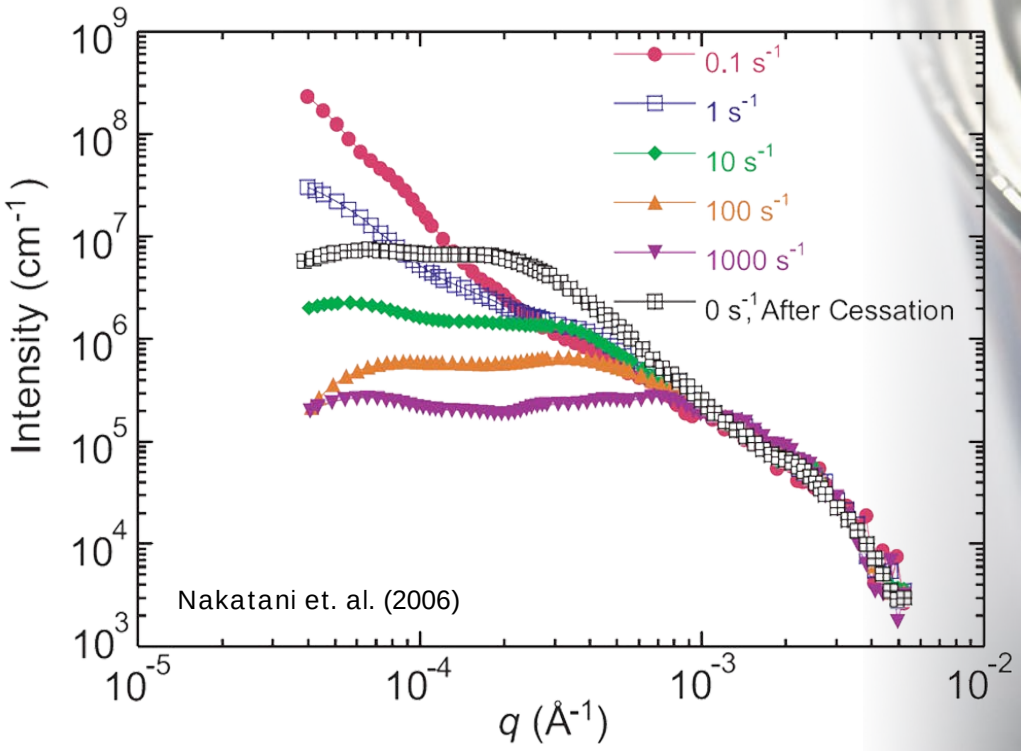
2010

The structure of paint under shear

Length scales: light or neutrons
Optically opaque: ~~light~~ or neutrons



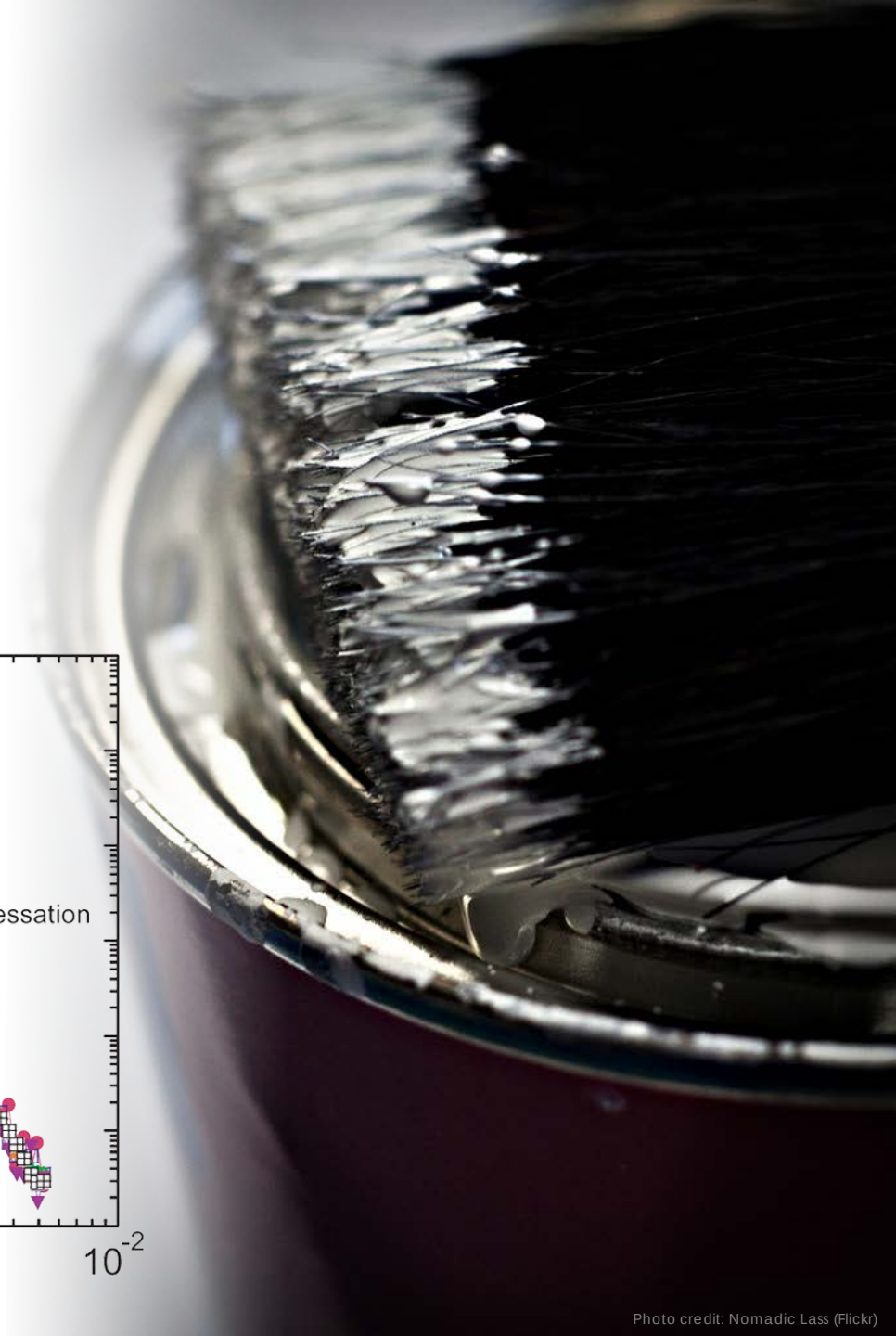


Photo credit: Nomadic Lass (Flickr)

NCNR

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“These measurements led to an accelerated development of new products for our businesses. These advancements would not have been possible without USANS.”

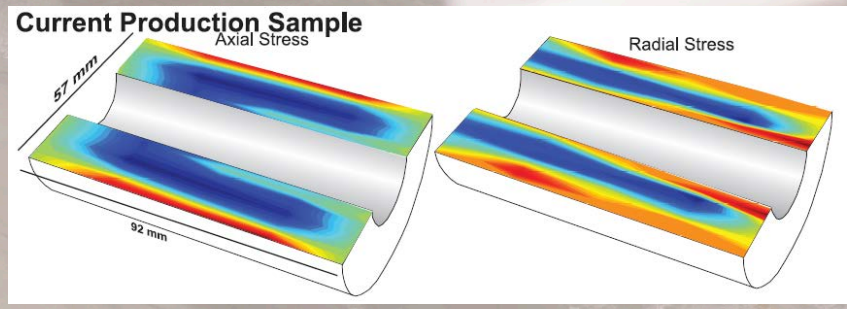
NCNR

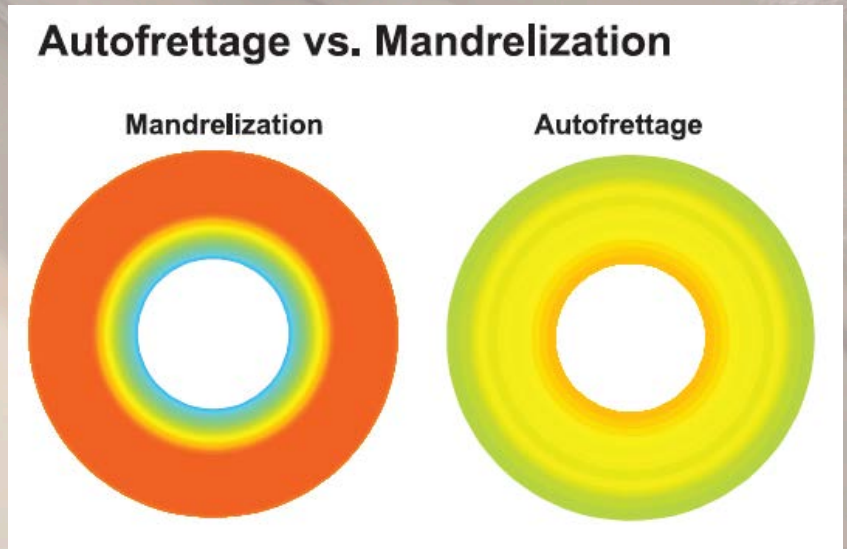
friction stir welding

NCNR

water-jet machining

NCNR



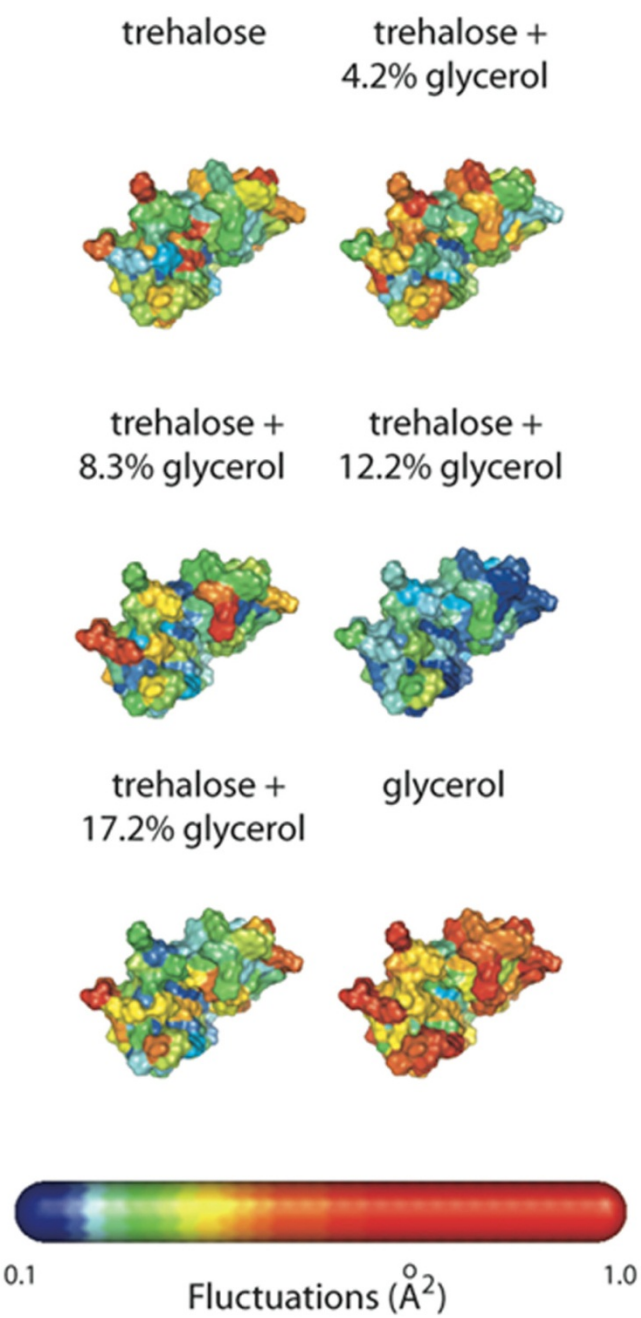


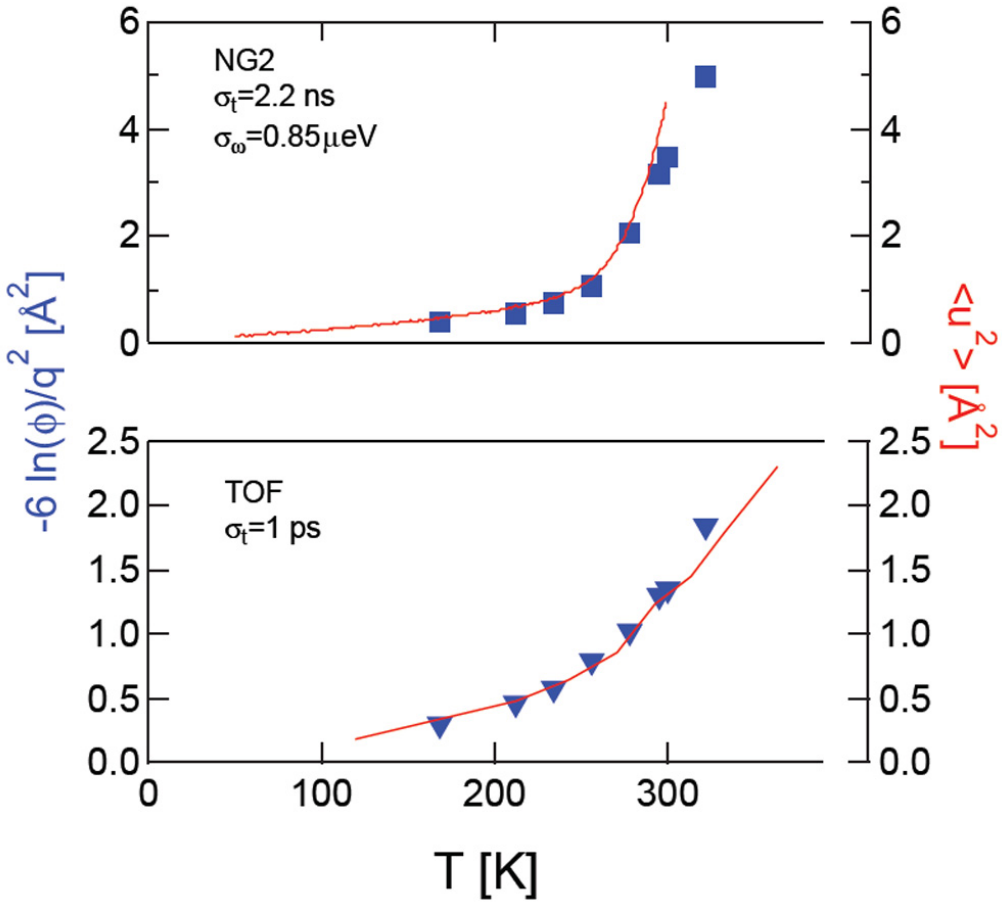
water-jet machining

NCNR

lyophilization

developing a new test for efficacy of protein stabilization



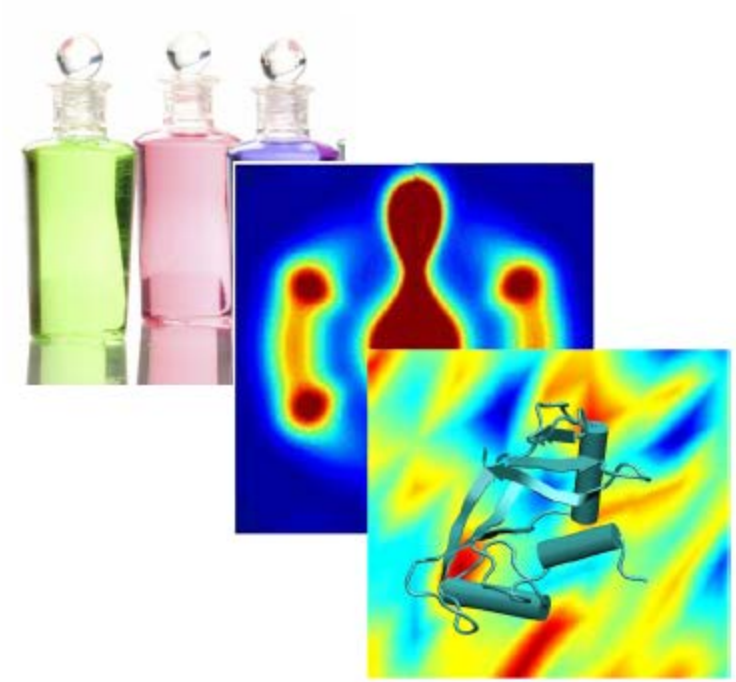


NCNR

nSoft

A consortium for the advancement of neutron-based measurements for manufacturing of soft materials.

"…to bring a new model of access to federal user facilities to the manufacturing based industry, with a specific focus on manufacturers of soft materials."



Ron Jones, nSoft Director
MML/NIST Polymers Division

Thank You