International Aspects of Nanotechnology: Competition and Cooperation

Celia Merzbacher, Ph.D.

Office of Science and Technology Policy

EPA STAR Review Workshop:
Nanotechnology and the Environment III

*28 October 2005 * Arlington, VA*

Areas of International Cooperation & Competition

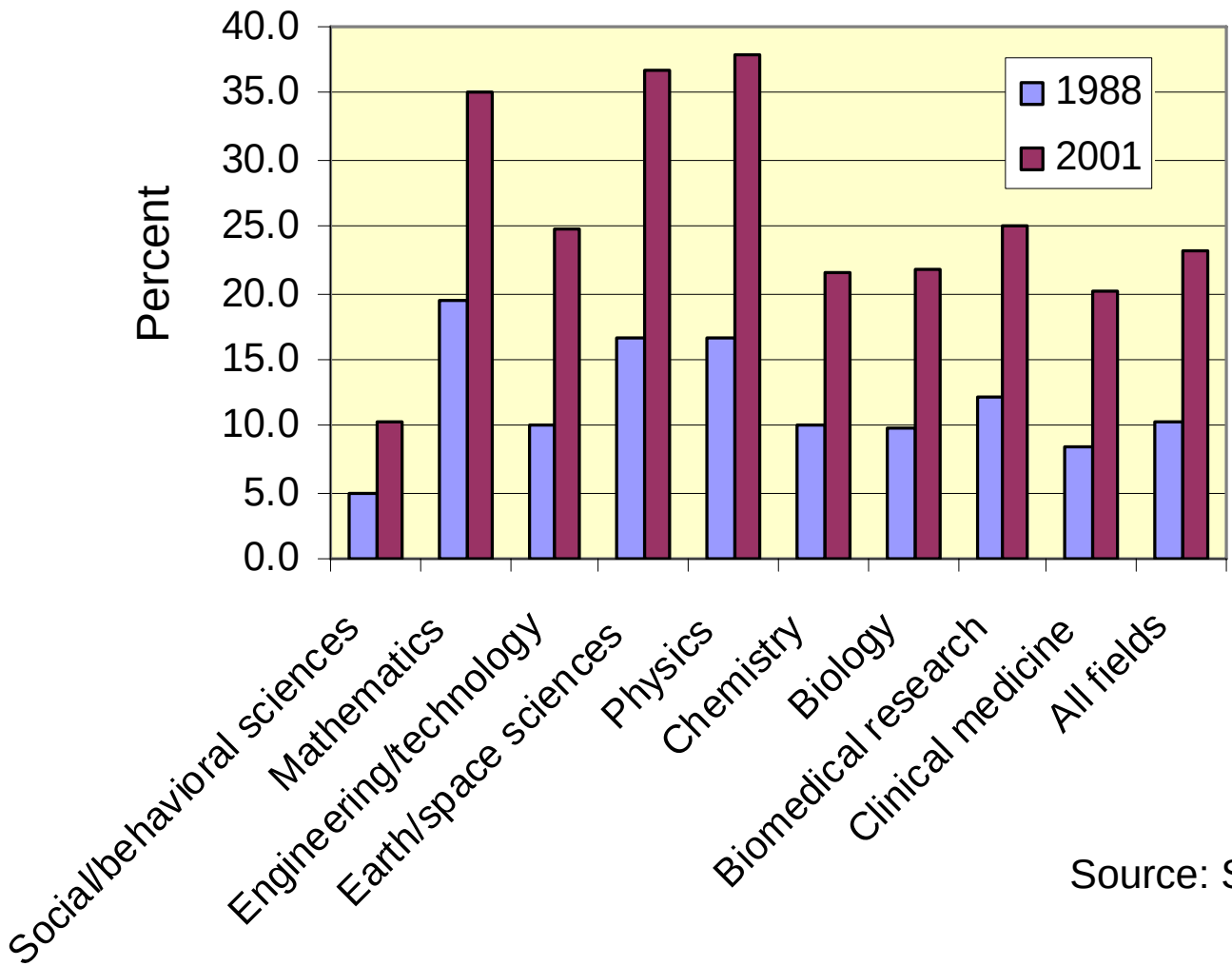
- Research
- Standards & trade
- Informal interactions

Collaborations are increasing

- Ease of interaction
- Policies supporting collaboration
- Educational programs
- Scientific need/advantage

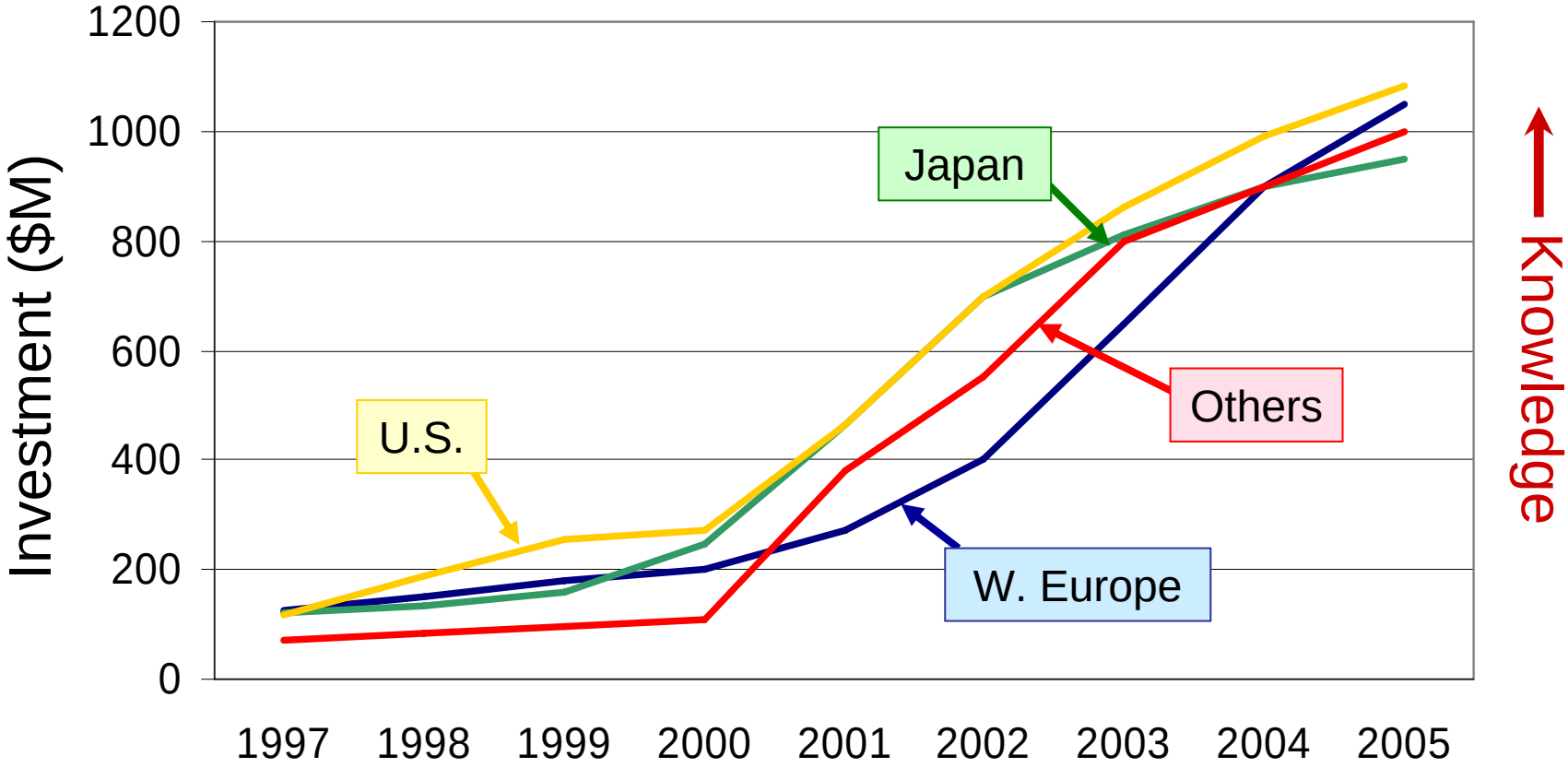
U.S.-based researchers coauthored 44 percent of all internationally coauthored publications in 2001. [NSB S&E Indicators]

International Collaboration on U.S. S&E Articles is Increasing



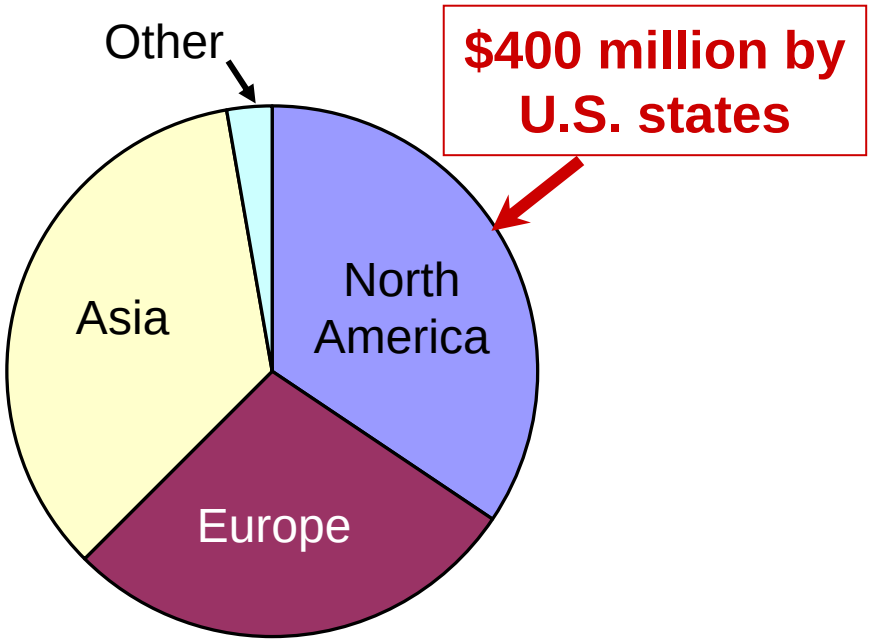
Source: S&E Indicators (2004)

International Nanotech R&D Investments are Increasing

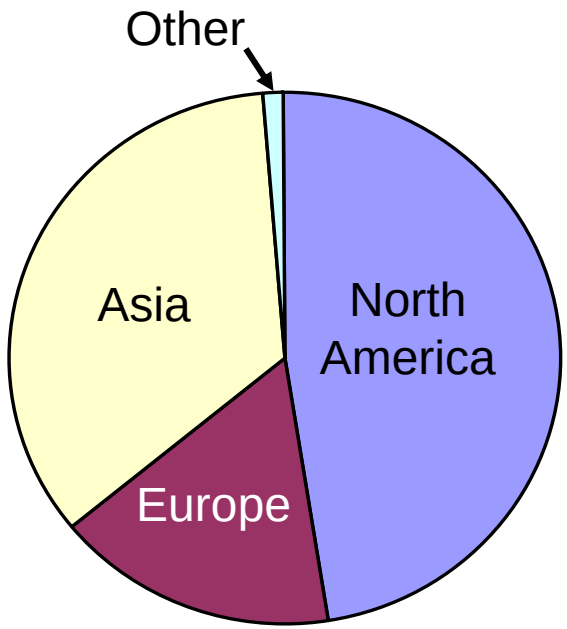


Source: M. C. Roco

Global investments in 2004 (Total=$8.6 billion)



Public (National, regional, state)
Total = $4.6 billion

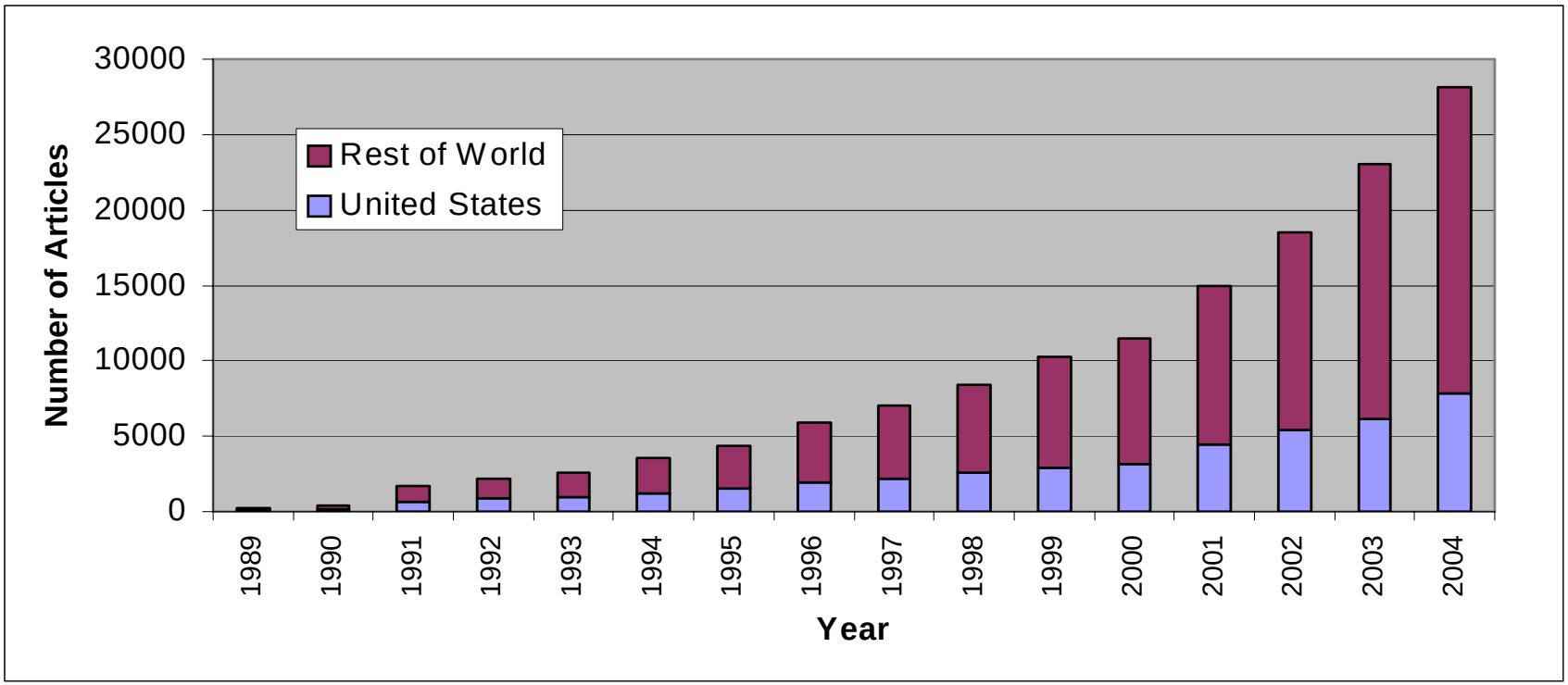


Private (Corp. + VC)
Total = $4 billion

Source: Lux Research

Nanotech publications are increasing

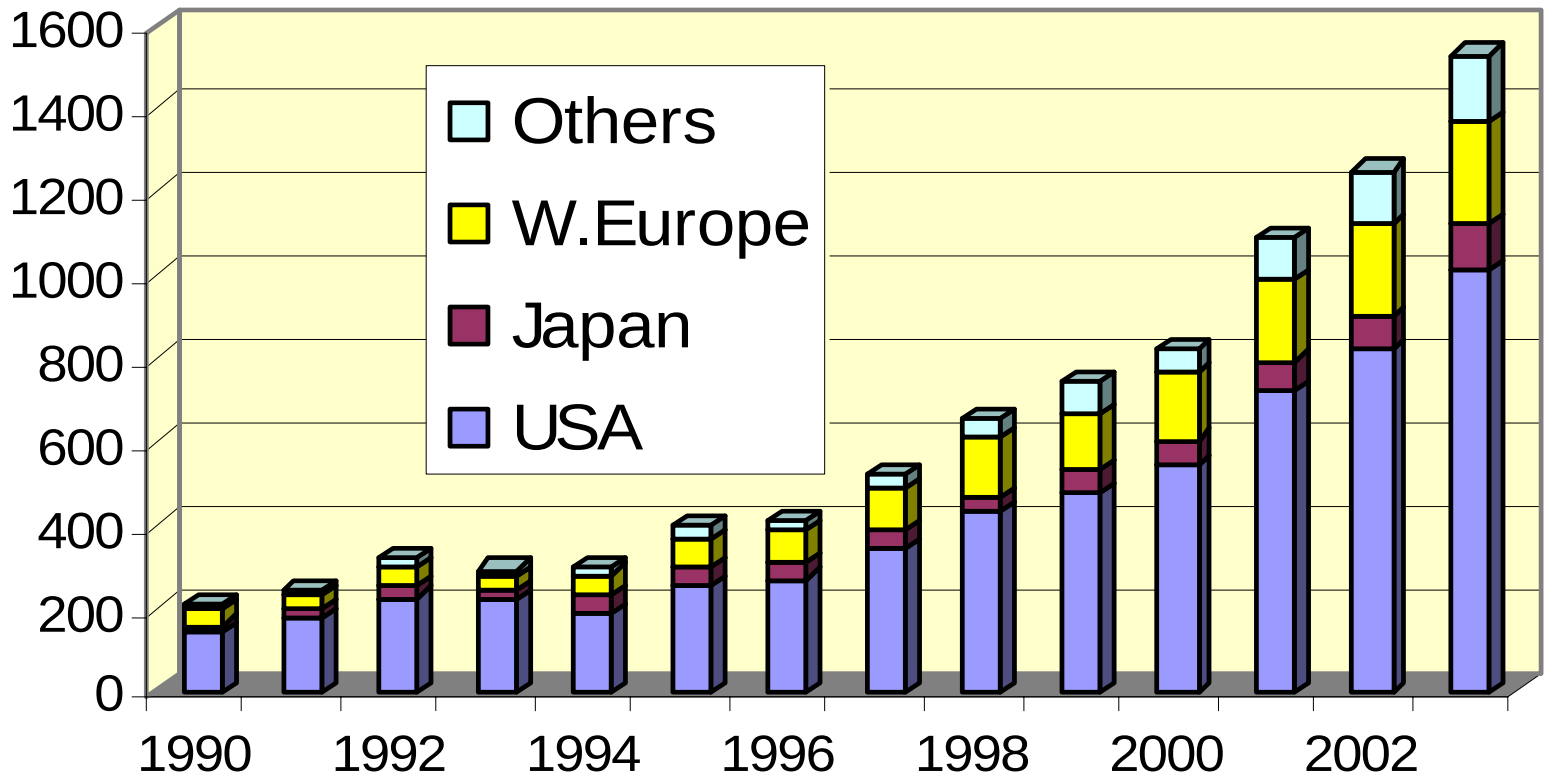
★ In 2004, 50% of collaborative articles have a U.S. author



Source: J. Murday, U.S. Naval Research Laboratory; ISI search using “nano*”

USPTO Nanotech Patents are increasing

★ Data for foreign nano patents are similar.



Source: Huang et al. (2004) J. Nanoparticle Research
Nanotechnology keyword search of titles and claims of patents in USPTO database

International Standards Activity

Why have nanotechnology standards?

- Aids research & development
- Supports commerce & trade
- Protects health & environment

U.S. Government standards policy

- National Technology Transfer and Advancement Act of 1995 ***requires USG agencies use voluntary, consensus standards*** in lieu of government-unique standards except where inconsistent with law or impractical.
- "Voluntary, consensus standards bodies" provide for:
  - Openness
  - Balance of interest
  - Due process
  - An appeals process
  - Consensus (general agreement, but not necessarily unanimity)

ASTM INTERNATIONAL
Standards Worldwide

Technical Committees

Committee E56 on Nanotechnology

Staff Manager: Pat Picariello (610) 832-9720

ASTM Committee E56 on Nanotechnology was formed in 2005. E56 meets twice each year, in May and November, with about 75 members attending three days of technical meetings (every 3rd to 4th meeting of E56 is held outside of the United States). This Committee addresses issues related to standards and guidance materials for nanotechnology & nanomaterials, as well as the coordination of existing ASTM standardization related to nanotechnology needs. This coordination includes the apportioning of specific requests for nanotechnology standards through ASTM's existing committee base, as well as the maintenance of appropriate global liaison relationships with activities (internal and external) related to this subject area. The Committee, with a membership of approximately 170, currently has its standards published in the Annual Book of ASTM Standards, Volume 14.02. E56 has 6 technical subcommittees that maintain jurisdiction over these standards. Information on this subcommittee structure and E56's portfolio of approved standards and Work Items under construction are available from the List of Subcommittees, Standards and Work Items below.

General Information
- E56 Scope
- Committee Officers and Staff Support
- Future Meetings
- Search Past ASTM Symposia

Get Involved
- Membership Information and Application
- New Member Orientation
- Invite a Colleague to Join

Standards Development
- List of Subcommittees, Standards, and Work Items
- Standards Development Tools
- Sign Up for Standards Tracker

What's New
- >> Committee News
- >> Next Meeting
- >> Next Symposium

Additional Information
- Background Material on New ASTM International E56

Technical Committees

Technical Committees / Committee E56 / List of Subcommittees and Standards

Committee E56 on Nanotechnology
Staff Manager: Pat Picariello (610) 832-9720

Subcommittees and Standards

Standards under the jurisdiction of E56

Each main committee in ASTM International is composed of subcommittees that address specific segments within the general subject area covered by the technical committee. Click on the subcommittee links below to see the title of existing standards for each subcommittee. Then, click on the resulting titles to see the standard's scope, referenced documents, and more.

E56.01 Terminology & Nomenclature
E56.02 Characterization
E56.03 Environmental & Occupational Health & Safety
E56.04 International Law & Intellectual Property
E56.05 Liaison & International Cooperation
E56.06 Risk Management and Product Stewardship
E56.90 Executive
E56.91 Strategic Planning and Review

U.S. Standards Coordination

- American National Standards Institute (ANSI)
  - Non-profit organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system.
  - Mission is to enhance the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems, and safeguarding their integrity.

ANSI
American National Standards Institute

American National Standards Institute (ANSI)

- 1000 member organizations
- Represents the U.S. at:
  - International Accreditation Forum (IAF)
  - International Organization for Standardization (ISO)
  - International Electrotechnical Commission (IEC)
  - Pacific Area Standards Congress (PASC)
  - Pan American Standards Commission (COPANT)

ANSI
American National Standards Institute

eStandards Store

About ANSI

Membership

Standards Activities

Overview

Background Papers

Critical Issue Papers

U.S. National Standards Strategy

U.S. Standards Strategy (revision of NSS)

United States Standards Strategy Committee (USSSC)

Public Review and Comment

Standards Action

ANSI Procedural Revisions

Accreditation Actions

Domestic Programs (American National Standards)

Overview

Procedures, Guides and Forms

PINS & BSR8/108 WEB Data Submittal Forms

Nanotechnology Standards Panel

The American National Standards Institute's Nanotechnology Standards Panel (ANSI-NSP) serves as the cross-sector coordinating body for the purposes of developing standards in the area of nanotechnology including, but not limited to, nomenclature/terminology; materials properties; and testing, measurement and characterization procedures.

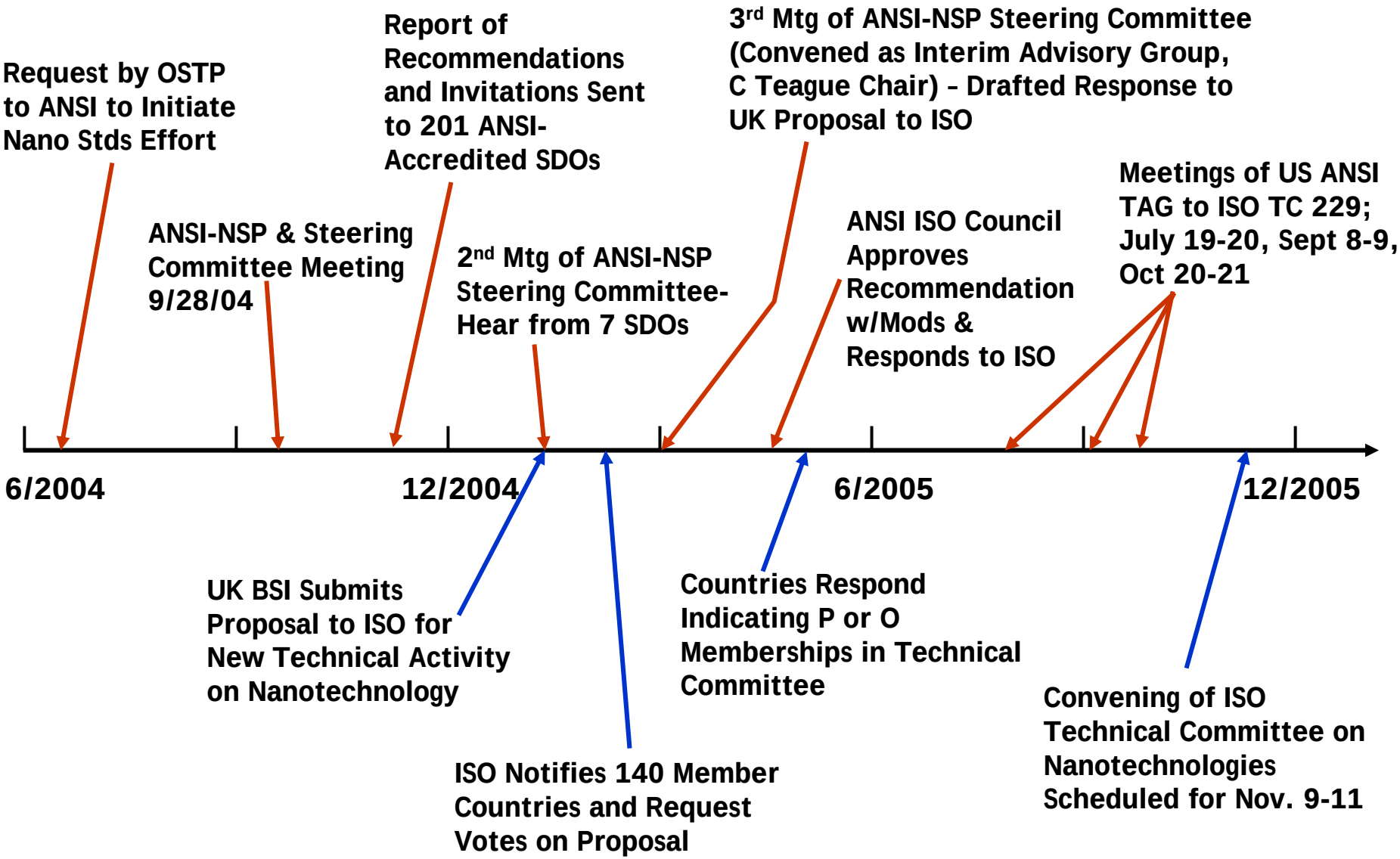
Nanotechnology refers to research and technology development at the atomic, molecular, and macromolecular levels aimed at creating and using structures, devices, and systems that have novel properties and functions because of their small size.

- Recent News Items
- Overview
- Membership
- Organizational Structure
- Meeting Calendar
- Document Library
- Membership in ANSI
- Staff Contacts

ANSI Nanotechnology Stds Panel Objectives

- Coordinate and provide a forum for interested parties to define needs.
- Facilitate development and adoption of standards responsive to identified needs.
- Where standards do not exist, obtain agreement from a standard developer to initiate development of the standard.
- Facilitate and promote cross-sector collaborative efforts between standards developing organizations.
- Maintain liaison with other national, regional and international standards efforts addressing nanotechnology issues to create identical or harmonize existing standards.

ANSI & ISO Nanotechnology Standards Activities



List of technical committees

Search for committee [ ] Start search ?

Committee	Title
JTC 1	Information technology
TC 1	Screw threads
TC 2	Fasteners
TC 4	Rolling bearings
TC 5	Ferrous metal pipes and metallic fittings
TC 6	Paper, board and pulps
TC 8	Ships and marine technology
TC 10	Technical product documentation
TC 11	Boilers and pressure vessels
TC 12	Quantities, units, symbols, conversion factors
TC 14	Shafts for machinery and accessories
TC 17	Steel
TC 18	Zinc and zinc alloys

	expansion turbines) - STAND BY
TC 209	Cleanrooms and associated controlled environments
TC 210	Quality management and corresponding general aspects for medical devices
TC 211	Geographic information/Geomatics
TC 212	Clinical laboratory testing and in vitro diagnostic test systems
TC 213	Dimensional and geometrical product specifications and verification
TC 214	Elevating work platforms
TC 215	Health informatics
TC 216	Footwear
TC 217	Cosmetics
TC 218	Timber
TC 219	Floor coverings
TC 220	Cryogenic vessels
TC 221	Geosynthetics
TC 222	Personal financial planning
TC 223	Civil defence
TC 224	Service activities relating to drinking water supply systems and wastewater systems - Quality criteria of the service and performance indicators
TC 225	Market, opinion and social research
TC 226	Materials for the production of primary aluminium
TC 227	Springs
TC 228	Tourism and related services
TC 229	Nanotechnologies - PROVISIONAL

© ISO | ISO name and logo | Privacy policy

POWERED BY Livelink

TC 229

Nanotechnologies - PROVISIONAL

Secretariat:	BSI
Secretary:	Mr. Jose Alcorta
Chair:	Dr. Peter Hatto until end 2010
Scope:	

Standardization in the field of nanotechnologies, with specific tasks being classification, terminology and nomenclature, basic metrology, characterization, including calibration and certification, risk and environmental issues. The methods of test are to include methods for determining physical, chemical, structural and biological properties of materials or devices for which the performance, in the chosen application, is critically dependent on one or more dimension of <100nm. Test methods for applications, and product standards shall come within the scope of the TC.

Total number of published ISO standards related to the TC and its SCs:	
Number of published ISO standards under the direct responsibility of the TC 229 Secretariat:	none
Participating countries:	23
Observer countries:	7

ISO technical programme:
(drafts and new work items under the direct responsibility of TC 229)

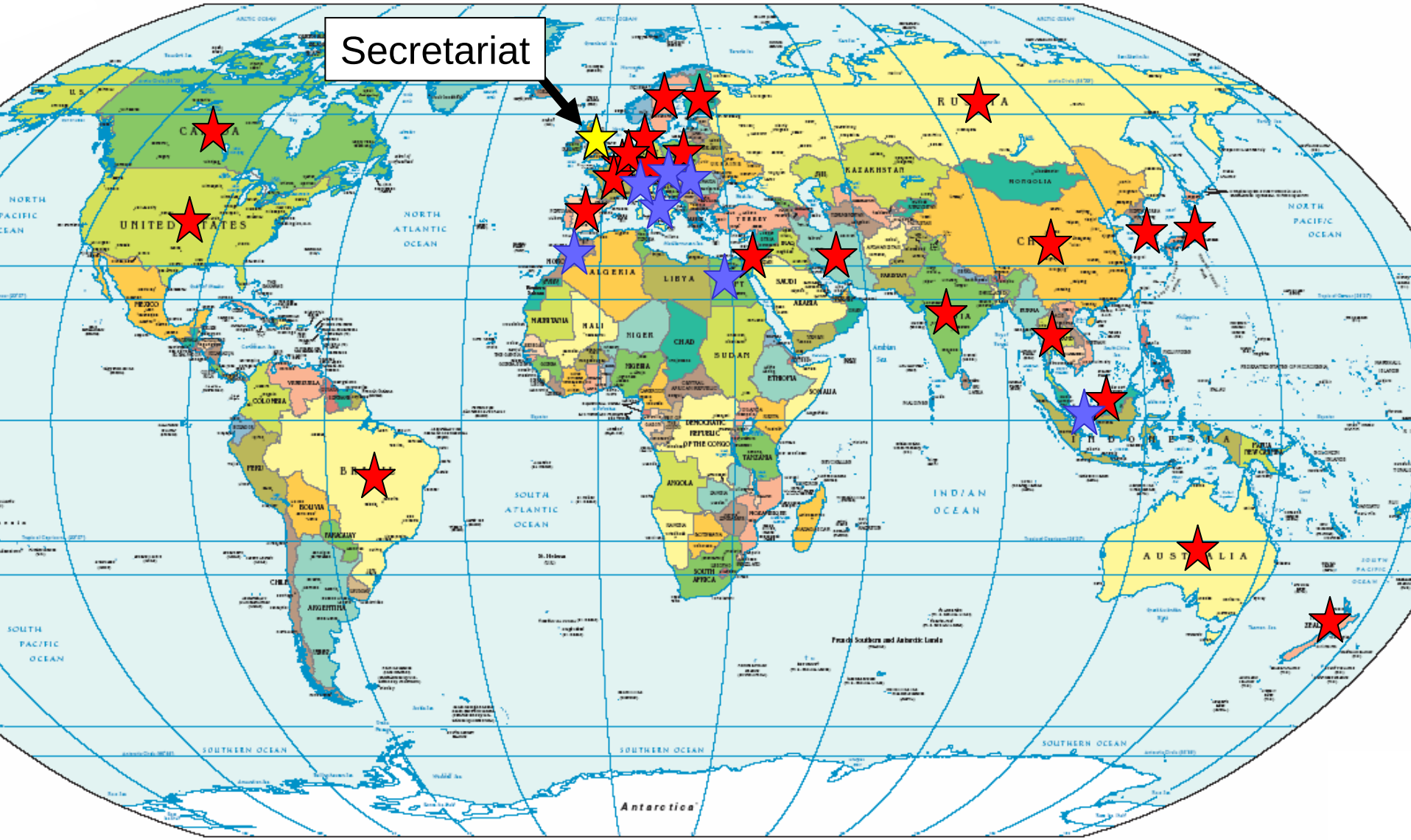
Working area on ISOTC

Meeting calendar

* Information definite but meeting not yet formally convened
** Provisional

Month	Date	Location	Committee
November 2005	*9-11*	London (United Kingdom)	* TC 229

ISO TC 229 Participating (★) and Observing (★) Countries



Other International Trade Activities Related to Nanotechnology

Preliminary discussions related to:

- Export control (President's Export Council)
- Wassenaar Agreement (dual-use and conventional weapons technologies)
- Visas

OECD Nano-related Activity

- Joint effort by Chemicals Committee and Working Party on Chemicals, Pesticides and Biotechnology
  - Workshop on the Safety of Manufactured Nanomaterials (Dec 2005, hosted by U.S.)
- Preliminary discussions within Council on Scientific & Technological Policy

International Dialogue on Responsible Research & Development of Nanotechnology

- Initial workshop held June 2004 in Alexandria, VA
- 25 countries + EU
- Follow-on held July 2005 in Brussels
- Next meeting to be hosted in 2006 by Japan

Meridian Institute

Connecting People to Solve Problems

REPORT
International Dialogue on Responsible Research and Development of Nanotechnology

Alexandria, Virginia, United States
17-18 June 2004

Andrew McMillan, NASA

NNI Supports International Collaborations

- NNI-funded user facilities are open to all
- Conferences & workshops
- Bilateral S&T agreements
- Funding of research with international colleagues
- Seeking nanotechnology-based solutions, e.g. under *Asia-Pacific Partnership on Clean Development*

THE WHITE HOUSE

WASHINGTON