



SUMMER  
NANOTECHNOLOGY  
STUDY PROGRAM  
IN JAPAN



# **NANOJAPAN: Preparing Globally Engaged Scientists and Engineers**

**SUMMER RESEARCH PROGRAM**

**SPONSORED BY THE NATIONAL SCIENCE FOUNDATION**

**Winner, 2008 Institute for International Education  
Andrew Heiskell Award for Innovation in Study Abroad**

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# National Science Foundation: Partnerships for International Research and Education

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***"At a time when scientific and engineering research is becoming increasingly global, this NSF program is designed to enable U.S. scientists and engineers to build strong, long-lasting international research collaborations and to develop a new cadre of globally engaged U.S. scientists and engineers," said Kathryn Sullivan, acting director of NSF's Office of International Science and Engineering, which awarded the PIRE grants.***

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# National Science Foundation: Partnerships for International Research and Education

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- **PIRE projects are characterized by:**
  - **close integration of research and education**
  - **extensive student preparation for foreign experiences and strong mentoring during international research**
  - **activities that will contribute to developing an international community of scholars at U.S. universities.**

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# NanoJapan Program Goals

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- **Encourage U.S. undergraduate students to:**
  - **Consider graduate school**
    - Declining number of U.S. graduate students
  - **Choose nanotechnology as field of study**
    - Strong graduate program at Rice (and other schools)
    - But few undergraduates majoring in the nanosciences
- **Develop a generation of globally-savvy engineers and scientists**
  - Create an international network of peers
  - Breakdown barriers (cultural, language, etc...)

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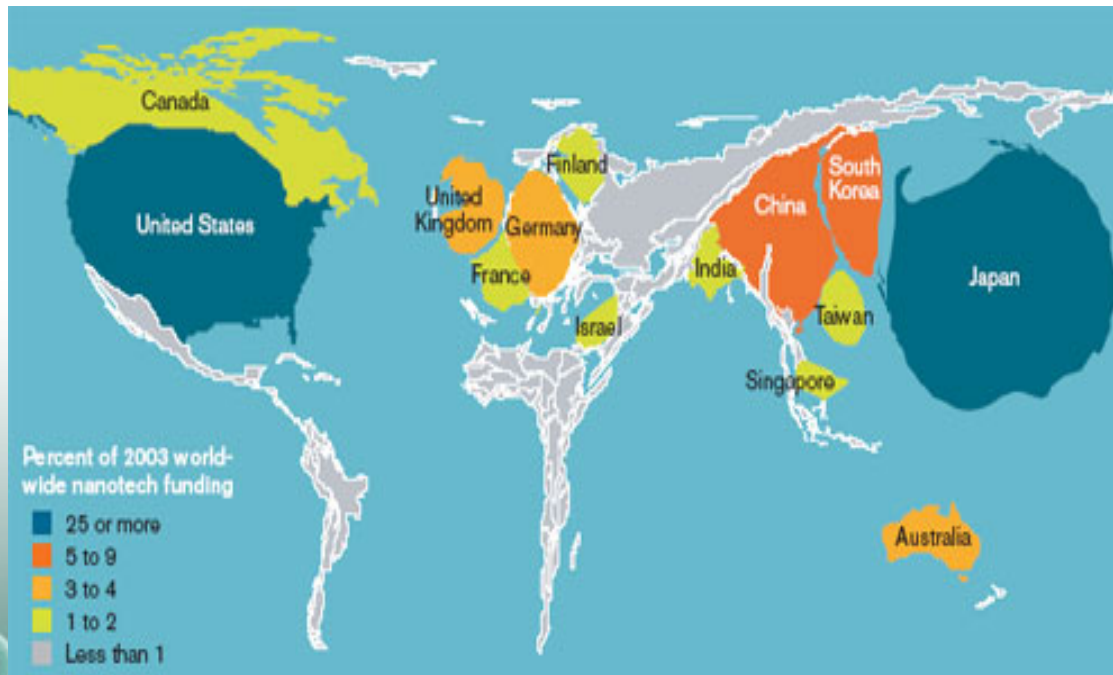
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# WhyJapan?

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- In 2004 Japan and the US accounted for 57% of worldwide nanotechnology R&D spending – (Japan slightly ahead of US)



# Program Design

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- **3-week orientation**
  - Intensive language instruction
  - Culture and society of Japan
  - Introduction to the science
- **7-week research internships with university and government labs**
- **Cultural excursions (Kyoto, Hakone, other)**
- **Post-program research conference**

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# NanoJapan 2007

## Summer Research Program

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Welcome  
back!  
おかえりな  
さい!



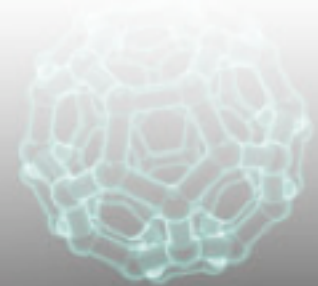
# Types of Research Projects

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- **Growth of nanomaterials**
  - **Endo, Maruyama (carbon nanotubes)**
  - **Itoh, Munekata, Sasa (semiconductor nanostructures)**
- **Fabrication of nanostructures**
  - **Hirakawa, Itoh, Iwasa, Kawata, Koga, Sasa, Yoh, Yusa**
- **Characterization & measurements**
  - **Hirakawa, Koga, Yoh, Yusa (electronic)**
  - **Kawata, Tonouchi (optical)**
  - **Nojiri (magnetic)**
  - **Itoh (microscopy)**
- **Applications**
  - **Endo (carbon nanotubes)**
- **Theory**
  - **Saito (carbon nanotubes)**

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# Eligibility

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- **Currently enrolled as a degree-seeking undergraduate student at a US institution of higher education**
- **Currently in the spring semester of your freshman or sophomore year**
- **In good academic standing and not currently on probation or under any disciplinary action at your home university**
- **Able to express a demonstrated interest in the field of nanotechnology as it relates to nanoscale semiconductor devices, nanophotonics, and carbon nanotubes**

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# Funding

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- **NanoJapan is supported by the NSF-PIRE Grant**
- **All costs during orientation provided**
  - **Lodging**
  - **Courses**
  - **Cultural Tour**
- **Each Student receives a stipend of up to \$3,500**
  - **International Airfare (group) deducted**
  - **Remaining Stipend to be used for living expenses**

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# Assessment

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- **Weekly blogs submitted during summer research experiences about topics related to living and working in Japan**
- **Intercultural Development Inventory**
- **Oral Proficiency Interviews**

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# Oral Proficiency Interviews



OPI Rating	2006 Participants	2007 Participants	Total overall
<b><i>Novice Low:</i></b> roughly equivalent to a beginning language student	-	1	1
<b><i>Novice-mid:</i></b> roughly equivalent to a student who has completed the first semester of a college-level language course. These students communicated by using a number of isolated words and memorized phrases, limited by the context in which the language has been learned	8	5	13
<b><i>Novice-high:</i></b> Roughly equivalent to the second semester of foreign language study. These students are able to manage successfully a number of uncomplicated communicative tasks in straight forward social situations	4	5	9
<b><i>Intermediate low:</i></b> Roughly the same as three semesters for college-level languages study. The students can operate in simple social situations and their conversation is restricted to some of the concrete exchanges and predictable topics necessary for survival in the target language culture. Six of these students had at least one semester of prior language study	4	4	8

# Intercultural Development Inventory (2007 participants)

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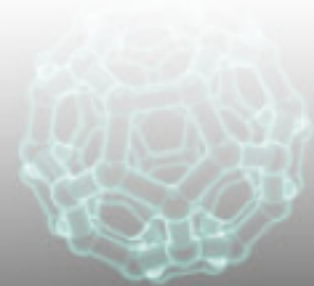


Pretest					
Denial	Defense	Minimization	Acceptance	Adaption	Integration
	<b>4 (36%)</b>	<b>6 (54%)</b>		<b>1 (8%)</b>	
Post-Test					
Denial	Defense	Minimization	Acceptance	Adaption	Integration
<b>1 (8%)</b>	<b>6 (54%)</b>	<b>2 (18/%)</b>	<b>1 (8%)</b>	<b>1 (8%)</b>	

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# 2008 Applicant Pool

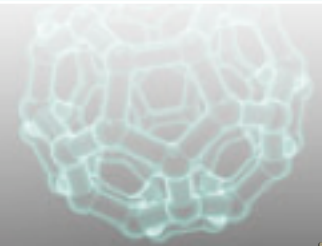
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Applicants	Gender	20 Majors (top)	Ethnicity	28 Universities (top)
<b>70</b>	<b>Male - 51</b>	<b>ECE - 18</b>	<b>Af. American - 6</b>	<b>Rice University - 20</b>
<b>Participants</b>	<b>Female - 19</b>	<b>Physics - 13</b>	<b>Asian - 30</b>	<b>Cornell University - 6</b>
<b>16 (TBA)</b>		<b>Bio E. - 9</b>	<b>Caucasian - 25</b>	<b>Univ. of Tulsa - 5</b>
		<b>Chem E. - 7</b>	<b>Hispanic - 3</b>	<b>Carnegie Mellon - 4</b>
		<b>Chem - 5</b>	<b>Other - 6</b>	<b>N. Seattle CC - 4</b>
		<b>ME - 4</b>		<b>TX A&amp;M Univ. - 4</b>



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# NSF International Funding Resources

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- [http://www.nsf.gov/funding/pgm\\_list.jsp?org=OISE](http://www.nsf.gov/funding/pgm_list.jsp?org=OISE)
- **NSF - PIRE**
- **NSF – International Research Experiences for Undergraduates (IREUs)**
- **NSF – International Conference & Planning Grants**
- **NSF – East Asia Pacific Summer Institute**
  - **NanoJapan for Graduate Students**

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# Contact Information

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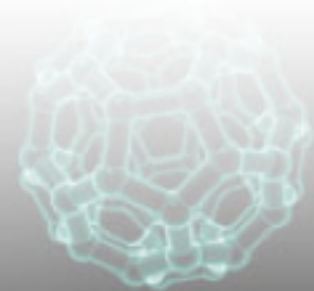
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