

# **RESEARCH COOPERATION AGREEMENT**

**Between the**

**NATIONAL MICROELECTRONICS CENTER OF SPAIN,**

**the**

**NANOTECHNOLOGY RESEARCH INSTITUTE NATIONAL INSTITUTE OF  
ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (JAPAN),**

**and the**

**PRECISION ENGINEERING DIVISION  
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (USA)**

## Article 1: PURPOSE

The National Microelectronics Center of Spain (CNM), located in Barcelona, Spain, the Nanotechnology Research Institute of the National Institute of Advanced Industrial Science and Technology (AIST), located in Tsukuba, Japan, and the Precision Engineering Division of the National Institute of Standards and Technology (NIST), located in Gaithersburg MD, United States of America, wish to establish scientific cooperation in the area of advanced lithography of functional nanostructures. This Agreement is an agreement in principle and is not intended to be legally binding upon the parties.

## Article 2: DEFINITIONS

As used in this Agreement, the following terms have the indicated meanings:

- 2.1 "Cooperation Agreement" or "Agreement" means this Agreement, entered into by NIST pursuant to Title 15 United States Code Sections 273 and 275(a). As a non-binding Agreement, this Agreement is not an "international agreement" pursuant to Title 22 CFR 181.2(a)(1) and (a)(2).
- 2.2 "Invention" means any invention or discovery conceived under this Agreement that is or may be patentable or otherwise protected under the laws of Spain, the United States, and Japan.
- 2.3 "Principal Investigator" or "PI" means the person designated respectively by each Party to this Agreement who will be responsible for the scientific and technical conduct of the research.
- 2.4 "Agreement Data" means all recorded information first produced in the performance of this Agreement.

### Article 3. COOPERATIVE RESEARCH

- 3.1 Research. The research under this Agreement is performed on a reasonable effort basis.
- 3.2 Reviews and Reports. Parties should exchange on a semi-annual basis written progress reports.

### Article 4. FINANCIAL OBLIGATIONS

No party will obligate funds under this Agreement. Each party is responsible for its own expenses.

### Article 5. INTELLECTUAL PROPERTY

- 5.1 Background Inventions. No rights to Background Inventions are conveyed by this Agreement.
- 5.2 Copyrights. Pursuant to Section 105 of title 17 of the United States Code, data prepared by KIST employees, and Data prepared jointly by KIST employees and Collaborator employees, are not subject to copyright in the United States.
- 5.3 Publication. The parties are encouraged to make publicly available the results of their research.
- 5.4 Agreement Inventions.
  - 5.4.1 Ownership and licensing rights to inventions created under this agreement, if any, should be determined at the time the invention is made and should be in accordance with laws, regulations and treaties applicable to the owning party(ies).
  - 5.4.2 Patent Applications. Each party may file patent applications on their respective sole inventions. The parties should coordinate filing of patent applications on jointly owned inventions.

### Article 6. TERMINATION

Parties may terminate this Agreement upon written notice to the other Parties.

### Article 7. DISPUTES

Any dispute arising under this Agreement should be settled amicably among the parties.

## Article 8. MISCELLANEOUS

- 8.1 Non Binding. This Research Agreement is not intended to be legally binding upon the parties. This agreement creates no legal rights and shall not be the basis for a cause of action against any party.
- 8.2 Entire Agreement. This Agreement constitutes the entire agreement between the Parties concerning the subject matter hereof.
- 8.3 Publicity The parties may publicize the projects and this Agreement, to the extent allowed by confidentiality, and in so doing, may acknowledge each Party's contribution. Notwithstanding the above, no party shall publicly suggest that the other Party endorses or recommends any product, process, methodology or results accruing from the project, without the express consent of the other Party.
- 8.4 Export of Technical Data Export of certain technical data may be prohibited by United States export laws and regulations including, but not limited to, the International Traffic in Arms Regulations (22 CFR Part 121 et seq.) and the Department of Commerce Export Regulations (15 CFR Part 770 et seq.). The parties agree to fully comply with such export laws and regulations including, when necessary, obtaining the appropriate licenses or approvals prior to making such exports, actual or deemed.

## Article 9: WORK STATEMENT

CNM, AIST and NIST desire to jointly pursue a coordinated effort to develop and systematize certain instrumentation and methodology in the field of advanced lithography. In particular, these efforts will focus on establishing criteria required for routine and reliable fabrication of functional nanostructures using scanning probe oxidation. Topics that may be addressed under the present agreement framework include: (1) Understanding and control of the underlying physical processes involved in producing nanometer-scale oxide patterns. (2) Establishing practical limits for oxide feature density and pattern placement accuracy. (3) Investigating the compatibility of this technique with additional processing steps such as optical and electron-beam lithography, chemical etching, and subsequent deposition of additional materials which are required for overall functionality of the device. (4) Developing a predictive materials-based model to extend scanning probe oxidation to a wide range of materials including metals, semiconductors, and insulators.

Under this agreement, CNM, AIST, and NIST will identify common interests in applications of SPM lithography for fabrication of prototype integrated electronic circuits, electrochemical and electromechanical sensor systems, opto-electronic components, two- and three-dimensional templates for biological and chemical studies, and nanoscale calibration grids and gratings.

**Respective undertakings:** To facilitate effective achievement of the scientific cooperation envisaged by this Research Cooperation Agreement:

A. CNM may:

1. Accept AIST and NIST scientific staff, the number to be agreed between the parties, to participate in selected joint research projects related to advanced lithography, particularly scanning probe lithography.
2. Allow scientists from CNM, the number to be agreed between the parties, to visit AIST and NIST to conduct seminars, workshops or special short courses, etc, at AIST, NIST or other organizations with which AIST and NIST have collaboration.
3. Accept scientists from AIST and NIST, the number to be agreed between the parties, to visit CNM to conduct seminars, workshops or special short courses, etc., at CNM or other organizations with which CNM has collaboration.
4. Cooperate with AIST and NIST in their conduct of research projects in the field of advanced lithography of functional nanostructures, with particular focus on scanning probe lithography and characterization.
5. Exchange information and share data from the collaborative research.
6. Prepare joint authorship publications.

B. AIST may:

1. Accept CNM and NIST scientific staff, the number to be agreed between the parties, to participate in selected joint research projects related to advanced lithography, particularly scanning probe lithography.
2. Allow scientists from AIST, the number to be agreed between the parties, to visit CNM and NIST to conduct seminars, workshops or special short courses, etc, at CNM, NIST or other organizations with which CNM and NIST have collaboration.
3. Accept scientists from CNM and NIST, the number to be agreed between the parties, to visit AIST to conduct seminars, workshops or special short courses, etc., at AIST or other organizations with which AIST has collaboration.
4. Cooperate with CNM and NIST in their conduct of research projects in the field of advanced lithography of functional nanostructures, with particular focus on scanning probe lithography and characterization.

5. Exchange information and share data from the collaborative research.
6. Prepare joint authorship publications.

C. NIST may:

1. Accept CNM and AIST scientific staff, the number to be agreed between the parties, to participate in selected joint research projects related to advanced lithography, particularly scanning probe lithography.
2. Allow scientists from NIST, the number to be agreed between the parties, to visit CNM and AIST to conduct seminars, workshops or special short courses, etc, at CNM, AIST or other organizations with which CNM and AIST have collaboration.
3. Accept scientists from CNM and AIST, the number to be agreed between the parties, to visit NIST to conduct seminars, workshops or special short courses, etc., at NIST or other organizations with which NIST has collaboration.
4. Cooperate with CNM and AIST in their conduct of research projects in the field of advanced lithography of functional nanostructures, with particular focus on scanning probe lithography and characterization.
5. Exchange information and share data from the collaborative research.
6. Prepare joint authorship publications.

Mutual undertakings:

- C. CNM, AIST and NIST intend to consult and cooperate with each other concerning research as it is related to advanced lithography, particularly scanning probe lithography.
- D. Participation of each party is subject to the availability of funds and priority planning.

Article 10: Principle Investigators

1. CNM's Principal: (The CNM PI may change at CNM management's sole discretion.): Dr. Francesc Perez-Murano  
Institute de Microelectronica de Barcelona. (IMg-CNM-CSIC)  
Campus de la Universitat Autònoma de Barcelona  
E-08193 Bellaterra. SPAIN

2. **AIST's Principal:** (The AIST PI may change at AIST management's sole discretion.)  
Dr. Hiroshi Yokoyama  
Nanotechnology Research Institute  
National Institute of Advanced Industrial Science and Technology (AIST) 1-1-4  
Umezono, Tsukuba, Ibaraki 305-8568, Japan
  
3. **NIST's Principal:** (The NIST PI may change at NIST management's sole discretion.)  
Dr. John A. Dagata  
Precision Engineering Division  
National Institute of Standards and Technology 220-A117 WS 8212  
Gaithersburg MD 20899-8212

This Agreement is effective from the date of full execution until January 2004, unless sooner terminated by either party.

SIGNATURES

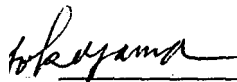
For the National Microelectronics Center (CNM)  
Spanish Research Council (CSIC)



Dr. Francesc Serra-Mestres  
Director  
Centro Nacional de Microelectrónica  
CSIC, Spain

9/3/01  
Date

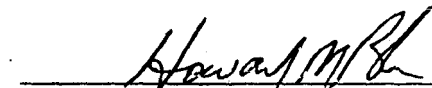
For the Nanotechnology Research Institute of the  
National Institute of Advance Industrial Science and Technology



Dr. Hiroshi Yokoyama  
Director  
Nanotechnology Research Institute  
AIST, Japan

7/30/01  
Date

For the Manufacturing Engineering Laboratory  
National Institute of Standards and Technology



Mr. Howard M. Bloom  
Director  
Manufacturing Engineering Laboratory  
NIST, USA

7/26/01  
Date

