

# **The Global Research Outreach (“GRO”) Program Proposal Guide & Format for the Year of 2012**

Sponsored by Samsung Electronics Co., Ltd. and related Samsung companies (“SAMSUNG”)

Conducted by SAMSUNG’s R&D Center, Samsung Advanced Institute of Technology (“SAIT”)

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# 1. Overview

The Global Research Outreach (“GRO”) Program is Samsung Electronics, Co., Ltd. (“SEC”) and related Samsung companies (“SAMSUNG”)’s annual call for proposal which is conducted by Samsung Advanced Institute of Technology (“SAIT”), SAMSUNG-wide R&D Center, open to world’s leading universities. It is designed to create opportunities – at colleges, and universities around the world – for exploring breakthrough & innovative research. With this call, SAMSUNG invites your best and novel ideas on a range of compelling research subjects with the goal of establishing a collaborative research relationship with SAMSUNG.

Program details are provided below. Research Proposal (“Research Project Specification”) will be accepted via the email (see 3. Proposal Submission).

## Important Dates

**Monday, March 12, 2012, 9:00 A.M. Korea Standard Time (UTC+9): Post GRO Call For Proposal on Web**  
GRO homepage is <http://www.sait.samsung.co.kr/eng/GROhome/gromain.jsp>

**Saturday, June 16, 2012, 9:00 A.M. Korea Standard Time (UTC+9): Deadline for submission**  
All proposals must be received no later than 9:00 A.M. Korea Standard Time (UTC+9), June 16, 2012.

**Monday, August 6, 2012 Notification of award decisions begins**  
Award results will be posted on GRO homepage and announced via email in parallel.

## Program Awards

Awards under the GRO Program are intended to provide contract-based financial support for selected research projects. Awards will be in the form of cash and provide in the range of **US\$50,000 to US\$100,000, plus additionally incurring overhead**. Awards may be renewed up to three (3) years, based on project duration, research outcomes and SAMSUNG business needs. Supported projects will be expected to begin on September 1, 2012.

## Eligibility for Awards

To be eligible for an award under this program, **an applicant’s university must accept GRO Research Agreement (“RA”) as part of the proposal-submission process** (see 3. Proposal Submission). Key provisions of the RA specify university and SAMSUNG project conditions and funding process for the project, intellectual property rights and clarify other important aspects of the research collaboration.

**Initial acceptance by the applicant’s university is accomplished through submission of an GRO RA**

**Acceptance Letter without any modifications, detailed in Appendix 1.** GRO RA Acceptance Letter also confirms that no confidential or proprietary information will be included in submitted proposals. **SAMSUNG will treat all information submitted in proposals as non-confidential and non-proprietary.**

GRO RA will be sent by request via email listed in contacts below.

Also applicant shall sign Personal Information Protection Act ("PIPA) Acceptance Letter.

Universities selected for awards shall also sign GRO RA before award processing.

## Evaluation Criteria

The GRO Program seeks ambitious and innovative proposals that expand SAMSUNG's fields of research and provide breakthrough ideas for SAMSUNG research needs. Our interest is to build research relationships with world-class researchers who have a track record of conducting creative research and deliver innovative ideas to SAMSUNG.

SAMSUNG will evaluate proposals against four primary criteria:

1. The innovativeness, ambition, scientific, and societal impact of the research
2. How well the proposed research addresses the subjects outlined in "Research Subject Description".
3. The research record and standing of the principal investigator in relevant field(s)
4. The strength of the research plan

SAMSUNG will have sole discretion in making awards.

## Confidential and Proprietary Information

Participants shall ensure that no confidential or proprietary information is included in submitted proposals. SAMSUNG will treat all information submitted in proposals as non-confidential and non-proprietary.

Under GRO Program, the proposals will be reviewed by SAMSUNG personnel, including SAMSUNG researchers, who will become knowledgeable of the information provided by the university researcher in the project proposal. During the evaluation process, SAMSUNG cannot maintain the confidentiality of information set forth in the proposals. Accordingly, SAMSUNG does not require, and does not desire, to receive any information that may be deemed confidential by the university researcher or the university.

## 2. 2012 Research Themes & Subjects

2012 GRO Program is seeking proposals in Fifteen (15) Research Themes.

Within these fifteen (15) themes, there are Seventy-one (71) special interest subjects for this year also.

However other subjects are also welcome.

Detailed Research Subject Description can be downloaded for each subject in GRO homepage

(<http://www.sait.samsung.co.kr/eng/GROhome/applyforGRO.jsp>)

Research Themes	Special Interest Subjects	Related Samsung Companies
I. Biomedical Science & Engineering (BSE)	1. Metabolic Dynamics Analysis and Simulation for Massive Molecular Network	SEC
	2. Computational Pathology for Cancer Evaluation and Patient Prognosis	SEC
	3. Protein Structure Prediction & Docking Simulation	SEC
	4. Personal-Health & Clinical Decision Support System (pCDSS) for SMART health	SEC
	5. Tissue and Nerve Sensing Technology (cancerous vs. benign)	SEC
	6. Role of Mechanotransduction in Therapy	SEC
II. Biotherapeutics	1. Antibody-Drug Conjugate (ADC)	SEC
	2. Non-antibody Protein Scaffold as Alternative to Antibody	SEC
III. Computational Science	1. High-Throughput Computational Screening	SEC
	2. Quantum-Mechanical Materials Calculations	SEC
	3. Information & Network Theory based on Statistical Physics	SEC
	4. Parallelization pattern based static performance estimation	SEC
IV. Connectivity	1. Analysis and Design of Networks based on Green Cloud Computing with Additional Constraints	SEC
	2. Concatenated Polar Codes	SEC
	3. Baseband Design for UHD(Ultra High Definition) Television	SEC
V. Energy	1. Low Frequency & Ultra-wide Bandwidth Piezoelectric Energy Harvester	SEC
	2. Ordered Bulk-heterojunction in Hybrid Solar Cells	CIL
	3. New Lithium Battery Materials or Structure for High Energy Density or High Power Density	SDI
	4. High Safety Energy Device for Electric Vehicle	SDI
VI. Image Sensor	1. High Resolution Computational Imaging based on Camera 2.0	SEC
	2. Development of High Performance in Sub-1um Pixel and Simulation Environment	SEC
	3. Energy Efficient Column Parallel Two Step ADCs for High Speed Imaging	SEC
	4. Resolution Enhancement of Image from Low Resolution Image	SEC
	5. Smart Image Sensor	SEC
	6. Si Photonic Biosensor for Healthcare	SEC
VII. Medical Technology - Imaging, 3D Modeling, Device, Graphic, etc.	1. Next Generation MRI	SEC
	2. Harmless Medical Imaging Technology with Real-time Functional Imaging	SEC
	3. Cardiovascular System Modeling & Simulation	SEC
	4. Organ/Tissue Physics Property Acquisition and Modeling	SEC
	5. MR Compatible Robot System for Image Guided Intervention	SEC
	6. Tissue Characterization Using Ultrasound	SEC
	7. Functional & Anatomical Imaging Probe System	SEC
	8. Laser-induced Ultrasonic Diagnosis System	SEC
	9. Novel Photo Conductor Materials for Medical Imaging X-ray Detectors	SEC

	10. Volumetric Rendering and 3D UI for Medical Applications to Achieve mHealth	SEC
	11. Smart Self Diagnostic Monitoring System	SEC
VIII. Metabolic Engineering	1. Integration of Metabolic Modeling and Omics Technology	SEC
	2. Application of Synthetic Biology for Metabolic Engineering	SEC
IX. New Materials	1. Ferroelectric Nonvolatile Transistor	SEC
	2. QD(Quantum Dot) Laser	SEC
	3. LED Single Crystal Phosphor	SEC
	4. Heat-Resistant Adhesives	SEC
	5. Development of New Biopolymer for Industrial Package	SFC
	6. Solution Processable Transparent Conductive Oxides	SFC
	7. New High Dielectrics Materials, Instead of Pure BaTiO3	SFC
	8. Solution Processable Organic Electronics Material	SFC
	9. Organic Material Forming the Block Barrier for Transition Metal	SFC
X. New Memory	1. Next Generation Memory System Architecture	SEC
	2. Vertical Poly Channel Transistor for 3D Integration	SEC
	3. ReRAM Materials and Architectures for Future Memory	SEC
XI. Next Generation ICs & Interconnections	1. Biomolecule-based Nanocontroller and Interface	SEC
	2. 2D Electronic Devices	SEC
	3. Organic Electro-chemical Transistor for Biological Applications	SEC
	4. Wireless Interconnection between Chips, Modules and Boards	SEC
	5. New 3D Interconnect Technology for Stacked Si-Devices	SEC
	6. High Mobility Transistor (III-V/Ge Channel), Tunnel FET, Nanowire FET	SEC
	7. Vth Variability Studies at Scaled 3D MOSFET Devices	SEC
XII. Power Electronics	1. Reliable Wide Band Gap Power Device	SEC
	2. Advanced EV Power Management Technology	SEC
XIII. Process & Design for Product Development	1. Nano Patterning Technology for Large Area and Low Cost	SEC
	2. Development and Testing Technology for Mobile Platform	SEC
	3. System Efficient ESD Design Methodology	SEC
	4. Modeling and Analysis of Delamination and Humidity Diffusion into Packages	SEC
	5. Embedded S/W QA (by 3rd Party, not Developer)	SEC
	6. Better-Than-Worst-Case Design	SEC
	7. Multi-scale Process Simulation	SEC
XIV. SOC	1. Development of High Performance / High Bandwidth / Low Power On-Chip Fabric for Server SOCs	SEC
	2. Effective Thermal Throttling Architecture for Mobile AP SOC - Estimating temperature and power consumption based on the measurements of internal activities of SOC	SEC
XV. UX	1. Advanced Spoken Dialogue Agent	SEC
	2. Digital Media Concept and Scenario based on Experience of Paper User	SEC
	3. Next Generation User Interface Methodology of Portable Smart Electronics	SEM

[Note] "SEC" Samsung Electronics, Co., Ltd. "CIL" Chell Industries Inc. "SFC" Samsung Fine Chemicals Co., Ltd. "SDI" Samsung SDI Co., Ltd. "SEM" Samsung Electro-Mechanics Co., Ltd.

# 3. Proposal Submission

## Required Documents & Submission

Applicants shall submit the following three (3) documents as an one(1) research proposal package :

- 1. Research Proposal (“Research Project Specification”)** : Proposals recommend to be no longer than 10 pages; additional pages may be used for supporting figures, images, data, CV or other documentation.  
For CV, provide a one(1) or two(2) page CV for the principal investigator, any co-principal investigator, and the proposed graduate student. Please, attach all CVs at the end of Research Proposal.  
Research Proposals are expected to provide answers, in English, in MS Word format only.  
Detailed format of the contents will be described in ‘Format of Research Proposal’ chapter of this document.  
(Recommended file name of proposal : ‘2012 GRO\_Theme Title\_Subj subject number\_Pi University name\_Pi Last name’, e.g. “2012 GRO\_Connectivity\_Subj 3\_Stanford\_Smith”)
- 2. Scanned Copy of Signed GRO RA Acceptance Letter:** To be eligible, applicants shall submit an unmodified GRO RA Acceptance Letter which is completed and signed by an authorized contract official of the universities.  
GRO RA will be sent by request via email listed in contact below.  
Scanned file of the GRO RA Acceptance Letter shall be sent in PDF format only.
- 3. Scanned Copy of PIPA Acceptance Letter:** To be eligible, applicants shall submit an unmodified PIPA Acceptance Letter which is completed and signed by an applicants.  
Please refer ‘PIPA’ for more details of Act on GRO homepage  
(<http://www.sait.samsung.co.kr/eng/GROhome/applyforGRO.jsp>)  
Scanned file of the PIPA Acceptance Letter shall be sent in PDF format only.

Proposal (Set of three(3) documents) shall be submitted in English via email listed below.

### Submission email address (alphabetical order) :

China	: <a href="mailto:gro.china@samsung.com">gro.china@samsung.com</a>
Europe	: <a href="mailto:gro.europe@samsung.com">gro.europe@samsung.com</a>
India & Asia	: <a href="mailto:gro.india@samsung.com">gro.india@samsung.com</a>
Japan	: <a href="mailto:gro.japan@samsung.com">gro.japan@samsung.com</a>
North America	: <a href="mailto:gro.usa@samsung.com">gro.usa@samsung.com</a>
Russia	: <a href="mailto:gro.russia@samsung.com">gro.russia@samsung.com</a>

# Format of Research Proposal

Proposal is expected to provide answers, in English, in MS Word format, to the following questions. It is recommend to be no longer than 10 pages. Appendices, if included, do not need to be included as part of 10 page count. (Recommended file name of proposal : '2012 GRO\_Theme Title\_Subj subject number\_Pi University name\_Pi Last name', e.g. "2012 GRO\_Connectivity\_Subj 3\_Stanford\_Smith")

## **PART 1 : Proposal Identification**

1. Title of Proposal (recommend using larger font size than for contents below)
2. 2012 GRO Project Theme number & Title
3. 2012 GRO Project Subject number & Title
4. Principal Investigator("PI") Information : a) Full name of PI, b) Affiliation (University, School, College and/or Department), c) Contact Information (Postal Address, e-Mail, Phone)
5. Co-PI Information (if applicable) : a) Full name of Co-PI, b) Affiliation (University, School, College and/or Department), c) Contact Information (Postal Address, e-Mail, Phone)
6. Announce Joint Proposal (if applicable)  
(e.g. This proposal is a joint proposal of "A" university and "B" university. Representative university is "A".)

## **PART 2 : Project Summary** (Approximately 1 page)

1. Announcement of Multi-year Proposal (if applicable)  
(e.g. I propose three year research and specific plan for this year will be described in this proposal)
2. Research Abstracts and Goals
3. One or two keywords that best capture the principal focus of proposed research

## **PART 3 : Description of Project**

1. Project Duration (dd/mm/yyyy ~ dd/mm/yyyy)
2. Research Objectives
3. Significance of Research
4. Research Plan and Technical Approach
5. Milestones
6. Expected Outcomes and Results (should describe tangible outcomes and intangible outcomes separately)

## **PART 4 : Budget (in US\$)**

1. Total Budget (Should describe Direct expenses(US\$50,000~US\$100,000) and Indirect costs(overhead) separately)

## **Appendix : Resources & Others**

1. CVs of Principal Investigator ("PI"), Co-Investigator(s), and the proposed graduate student(s)
2. Equipments or Facilities
3. Others
4. External Funding, if applicable

If your Proposal is multi-year based, please specify in PART 2. But PART 1, 3, and 4 shall be completed on a one year proposal base.

If your Proposal is a joint proposal, PART 4 Budget should be detailed separately for each university but total amount of budget of two universities cannot be exceed US\$50,000~US\$100,000 in direct expenses

Please note that, for multi-year proposals, awards will be made for one year only. Your project may get funded for up to three consecutive years only after you submit updated Proposals and get selected again for the subsequent years. This will be guided by your counter engineer in SAMSUNG during your first year.

## FAQ & Contacts

Frequently Asked Questions are answered in official GRO website  
(<http://www.sait.samsung.co.kr/eng/GROhome/faq.jsp>)

For further inquiry and any comments, please contact us.

- China : [gro.china@samsung.com](mailto:gro.china@samsung.com)
- Europe : [gro.europe@samsung.com](mailto:gro.europe@samsung.com)
- India & Asia : [gro.india@samsung.com](mailto:gro.india@samsung.com)
- Japan : [gro.japan@samsung.com](mailto:gro.japan@samsung.com)
- North America : [gro.usa@samsung.com](mailto:gro.usa@samsung.com)
- Russia : [gro.russia@samsung.com](mailto:gro.russia@samsung.com)

# Appendix 1: Global Research Outreach Research Agreement Acceptance Letter

Advance acceptance by an applicant's university of GRO Program Research Agreement ("RA") is required for each Research Proposal ("Research Project Specification") submission.

GRO RA Acceptance Letter template is provided as a file on GRO Web.  
(<http://www.sait.samsung.co.kr/eng/GROhome/applyforGRO.jsp>)

GRO RA Acceptance Letter also certifies that no proprietary or confidential information is included in submitted Proposals.

GRO RA Acceptance Letter shall be completed and signed – **without modification** – by an authorized contract official of the university. Applicants are responsible for determining the appropriate authority in their university to sign GRO RA Acceptance Letter. The signature of the applicant will not be accepted under any circumstances as proof of acceptance by the university. Applicants shall submit scanned GRO RA Acceptance Letter by email in PDF file format.

GRO RA will be sent by request via email listed in contact below.

China	: <a href="mailto:gro.china@samsung.com">gro.china@samsung.com</a>
Europe	: <a href="mailto:gro.europe@samsung.com">gro.europe@samsung.com</a>
India & Asia	: <a href="mailto:gro.india@samsung.com">gro.india@samsung.com</a>
Japan	: <a href="mailto:gro.japan@samsung.com">gro.japan@samsung.com</a>
North America	: <a href="mailto:gro.usa@samsung.com">gro.usa@samsung.com</a>
Russia	: <a href="mailto:gro.russia@samsung.com">gro.russia@samsung.com</a>

Award-winning universities must additionally sign GRO RA before awards can be processed. The completed GRO RA Acceptance Letter is not a substitute for the signed GRO RA.

## Appendix 2: Personal Information Protection Act (“PIPA”) Acceptance Letter

Advance acceptance by an applicant of PIPA is required for each Research Proposal (“Research Project Specification”) submission by Korean Law.

PIPA Acceptance Letter template is provided as a file on GRO Web.  
(<http://www.sait.samsung.co.kr/eng/GROhome/applyforGRO.jsp>)

PIPA Acceptance Letter shall be completed and signed – ***without modification*** – by an applicant of research proposal.

Applicants shall submit scanned PIPA Acceptance Letter by email in PDF file format.