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UNU-IIST

International Institute for
Software Technology

Report on 2006 Survey of UNU-IIST Former Fellows

Dang Van Hung, Alice Pun and Chris George

November

UNU-IIST and UNU-IIST Reports

UNU-IIST (United Nations University International Institute for Software Technology) is a Research and Training Centre of the United Nations University (UNU). It is based in Macao, and was founded in 1991. It started operations in July 1992. UNU-IIST is jointly funded by the government of Macao and the governments of the People's Republic of China and Portugal through a contribution to the UNU Endowment Fund. As well as providing two-thirds of the endowment fund, the Macao authorities also supply UNU-IIST with its office premises and furniture and subsidise fellow accommodation.

The mission of UNU-IIST is to assist developing countries in the application and development of software technology.

UNU-IIST contributes through its programmatic activities:

1. Advanced development projects, in which software techniques supported by tools are applied,
2. Research projects, in which new techniques for software development are investigated,
3. Curriculum development projects, in which courses of software technology for universities in developing countries are developed,
4. University development projects, which complement the curriculum development projects by aiming to strengthen all aspects of computer science teaching in universities in developing countries,
5. Schools and Courses, which typically teach advanced software development techniques,
6. Events, in which conferences and workshops are organised or supported by UNU-IIST, and
7. Dissemination, in which UNU-IIST regularly distributes to developing countries information on international progress of software technology.

Fellows, who are young scientists and engineers from developing countries, are invited to actively participate in all these projects. By doing the projects they are trained.

At present, the technical focus of UNU-IIST is on formal methods for software development. UNU-IIST is an internationally recognised center in the area of formal methods. However, no software technique is universally applicable. We are prepared to choose complementary techniques for our projects, if necessary.

UNU-IIST produces a report series. Reports are either Research [R], Technical [T], Compendia [C] or Administrative [A]. They are records of UNU-IIST activities and research and development achievements. Many of the reports are also published in conference proceedings and journals.

Please write to UNU-IIST at P.O. Box 3058, Macao or visit UNU-IIST's home page: <http://www.iist.unu.edu>, if you would like to know more about UNU-IIST and its report series.

G. M. Reed, Director



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Abstract

An on-line survey of former UNU-IIST fellows was made in June-August 2006. 82 former fellows answered the questions in the on-line questionnaire. This report summarises the results from the survey.

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1 Introduction

So far UNU-IIST has trained more than 325 fellows, both in Macao and abroad. Their opinion is an important factor for the evaluation and improvement of the UNU-IIST programme, and should be taken into account for revising the programme for the future.

A survey of former fellows was made in 2002 and another survey of the ex-fellows of the project “development of computer science departments of universities in developing countries” was made in 2004. The results and comments received from those surveys have contributed to widening UNU-IIST focus and activities in the last few years.

To evaluate UNU-IIST activities since then, and to revise the program further, another survey of former fellows was conducted by UNU-IIST during June – August 2006. The on-line questionnaire for the survey was made available at <http://project.iist.unu.edu/Survey2006/>. The director of UNU-IIST sent out a letter to encourage the former fellows to attend the survey on June 15, 2006, and the deadline for submitting the questionnaire was set as August 15, 2006. 82 former fellows answered the questions of the questionnaire.

The survey results are summarised in the next section. Section 3 gives details of the answers to the questions in the questionnaire. The list of the participants is given in the last section.

2 Survey Results Highlight

The questionnaire consists of 27 questions. Questions 22–27 are for collecting the comments and suggestions from former fellows for a variety of UNU-IIST activities. The other questions are for the evaluation of the impact and effectiveness of the training activities so far. The survey result shows that:

- About one third of fellows were discovered via UNU-IIST training courses; a half of fellows applied through direct contact with UNU-IIST staff.
- More than half of fellows changed their job after returning.
- Nearly half of fellows have obtained PhD degree. Some have high positions (director, professor, vice president of Guizhou academy of Sciences)
- Most are working in the academic field as lecturers and researchers
- About 90% says that they have benefited a lot from the knowledge gained in UNU-IIST. More than half of fellows are working in the area of topics studied in UNU-IIST, and 70% said that UNU-IIST courses have an impact on their current job
- 70% disseminated their knowledge gained in UNU-IIST with their colleagues via seminars, courses, course materials, conducting research, publishing articles, etc.

- More than one third said they have introduced UNU-IIST courses in their university.
- The number of publications by ex-fellows is significant (568 publications)
- Most of the fellows are in touch with UNU-IIST staff after they left UNU-IIST.
- Half of fellows want to have another fellowship with UNU-IIST.
- It is good that nearly half of fellows visit UNU-IIST website frequently to access news and reports.

The former fellows send a lot of suggestions and comments to UNU-IIST via the questionnaire. Those are summarised as follows.

For maintaining contact with former fellows :

- A website with up-to-date information for former fellows, a mailing list, a forum to discuss common interests, and links to ex-fellows websites.
- UNU-IIST should organise a conference or workshop for its former fellows in Macao, and invite former fellows to give presentations.
- The Alumni Association News Letter should be resumed.

For improving contents/subjects of training courses :

- A course on the overall background of formal methods, to show where formal methods are not suitable
- Should have strong practical component.
- On-line courses
- Purely research based Msc/Phd courses providing Msc/PhD degree
- To bring in a balance between theory and technology
- Sponsor more courses in developing countries
- When organising courses maximum input from local organisers should be taken
- Be more oriented towards practical application of computer science
- Courses given by senior research fellows giving a relatively complete theory and promising research topics.

For the training subject focus :

- Formal verification, model checking and theorem proving tools, industrial case studies, real-time embedded systems, formal models of security
- Web-service, Databases, distributed computing, Model Driven Architecture, Software Development Methods, UML

- Formal models for object and component systems, formal specification of real-time systems

For widening the technical scope :

- Algorithms and Advanced Data Structures, Theory of Computing
- Conducting more conferences and workshops
- New research and development projects that attract people from industry
- PhD programme in collaboration with other universities from developing countries

For activities in developing countries :

- More training courses in more sites
- Recruiting more fellows
- e-governance assistant in Kenya, Mongolia; joint PhD program with Lagos, courses in Uruguay, supporting research groups of ex-fellows.
- More courses in Universities in Vietnam, more activities with China

As other suggestions :

- Sending fellows to study in USA
- Be more involved in research in African countries
- Increase stipend for UDP fellows since the value of USD has depreciated.
- Make course contents available in the website
- Keep fellows informed of UNU-IIST courses organised in their home countries

3 Survey Results

Q1. *How did you apply for UNU-IIST fellowship?*

1. through UNU-IIST training course: 35%
2. through direct contact with UNU-IIST staff: 50%
3. recommended by former fellow: 10%
4. other: 5%

Q2. *Which projects of UNU-IIST were you involved in during your fellowship with UNU- IIST?*

1. ATC2000
2. RAISE
3. Formalizing UML and OOP
4. Verifying BPEL processes with authorization constraints via model checking

5. Design Techniques for Real-time Systems
6. Hardware/software Codesign
7. Object-Oriented Design Patterns
8. Curriculum Development Project
9. Manufacturing Infrastructure Project - Modeling Distributed Production Processes
10. University Development Project
11. Distance learning sub-project, supervised by Chris George
12. Specifying a Mobile Computing Application Environment Using RSL
13. Model Based Testing
14. Ministry of Finance Information Technology (MoFIT)
15. INCOM
16. Workshop for developing country "Decision Support Systems for Environmental Sustainability"
17. Model Based Travel Planning
18. eMacao
19. Protocol-Based Cooperation in a Virtual Manufacturing Organization
20. Agricultural Systems Infrastructure
21. Airline Business Computing
22. Formal Development of XML Applications
23. CASINO
24. Software Testing
25. Component based software
26. CIMS
27. Prototype Automatic Generation in collaboration with Macau University
28. Formal Methods and Component-based Embedded Systems

Q3. *Have you changed your job since returning from your fellowship with UNU-IIST?*

- Yes: 56%
- No: 44%

Q4. *What is your current title?*

1. Dr: 37%
2. Professor: 7%
3. Assoc. Professor: 17%
4. Director: 1%
5. Manager: 3%

6. Other: 35%

Q5. *What is your current job?*

1. Teaching: 53%
2. Research: 31%
3. Development: 9%
4. Management: 4%
5. Other: 3%

Q6. *How much does the knowledge gained during your fellowship with UNU-IIST benefit you in your current job?*

1. very much: 53%
2. quite a lot: 35%
3. somewhat: 9%
4. a little: 2%
5. not at all: 1%

Q7. *Are you still working in the area of the topics you studied in UNU-IIST?*

1. Yes: 65%
2. No: 45%

What is the reason for change?

1. old topics are not used locally: 1%
2. new topics are more interesting: 6%
3. demand of current job: 23%
4. other: 70%

8. *Which UNU-IIST training courses did you attend?*

1. RAISE: 72%
2. Duration Calculus: 38%
3. The B Method: 10%
4. Model checking and SPIN: 10%
5. Design and Processing of XML Languages: 8%
6. Software Development with UML: 23%
7. Software testing: 10%
8. Programming Concurrent Computer Systems: 5%
9. Real-Time systems: Specification, Verification, Refinement and schedulability: 13%
10. Security: Principles, Techniques and Verification: 5%

11. Software Project Management: 27%
12. Others: 16%

Q9. *Do these courses have an impact on your current work?*

1. very much: 39%
2. quite a lot: 27%
3. somewhat: 22%
4. a little: 7%
5. not at all: 5%

Q10. *Have you carried out any activities to share the knowledge gained from the fellowship with other colleagues in your institution?*

1. No: 30%
2. Yes: 70%

What are these activities?

1. seminars, courses and workshops
2. a suggestion to others
3. tutorials for research team
4. training M.Sc. students
5. publishing Master Theses written at UNU-IIST
6. disseminating information about UNU-IIST-Organization of a RAISE course given by Chris George (in 1999)- Development of a software Engineering course given at Universidad Nac. de la Patagonia Austral (with some formal methods topics).
7. supervising graduate thesis on pattern formalization, lecturing courses on RAISE
8. lecturing on Duration Calculus Seminar, provide materials
9. research discussions
10. making the books bought during the fellowship available to both students and staff suggested and organize a curriculum program with University of Ibadan, disseminating knowledge to student via teaching and project work
11. publishing article about UNU-IIST life and research activities during my stay at UNU-IIST
12. teaching some courses about the subjects that I learn in my fellowship
13. talks, meetings and starting point to create research groups
14. seminar for colleagues and sharing books obtained through UNU fellowship presentation and discussion
15. teaching RSL subject and training tool
16. organizing national conferences of information technology and communication

17. helping UNU-IIST research fellows to hold seminars (in Beijing)
18. seminar on Real Time Systems
19. building course websites; sharing books
20. writing software specification using B-method and UML informal discussions

Q11. *Did you establish any new courses in your university related to the topic of your fellowship?*

1. No: 66%
2. Yes: 34%

Please describe such courses:

1. SPIN
2. Software Hardware Co-design
3. Modeling and verifying hybrid and embedded systems
4. Specification and Verification
5. Formal Approach to Component Based Software Development
6. Formal Software Specification
7. Agent-oriented Software engineering
8. Introduction to Formal Methods
9. Formal Methods in Software Development
10. Formal methods for software engineering
11. Software Project Management
12. Web Information Systems
13. Data warehouse and data mining
14. Duration Calculus
15. Network security
16. Distributed Operating System
17. Foundation of software engineering
18. RSL
19. Formal Methods
20. Formal specification of UML/OCL Combined Models
21. System analysis and verification
22. Real-Time Programming
23. Software Analysis and Design
24. Wireless systems
25. Software Reuse

26. Software Development using Formal Methods
27. The B method
28. UML with OCL
29. Model checking and SPIN
30. Compiler and Interpreter
31. Component-Based Development
32. Software engineering

Text books used:

1. Logic in Computer Science
2. RSL reference book
3. Component Based Software Development - Czypersky, UTP and other UNU-IIST resources
4. The RAISE Specification Language
5. Materials from web site
6. Programming from Specification, Carol Morgan, RAISE Language and Method Book RAISE
7. Bob Hughes, Mike Cotterell, Software Project Management, 1999 etc
8. Programming the world wide web, Robert Sebesta
9. Jiawei Han, Micheline Kamber, Data mining: concepts and techniques
10. Stalling, Network security
11. Distributed Operating System
12. RSL reference book
13. Using Z
14. J. Warmer and A. Kleppe. The Object Constraint Language. Second Edition. Getting Your Models Ready for MDA. 2003.
15. Object Management Group OMG. UML 2.0 OCL Final Adopted Specification. OMG Document, 2005.
16. Object Management Group OMG. UML 2.0 Specification. OMG Document, 2005.
17. L. Reynoso, M. Genero and M. Piattini, Measuring OCL Expressions: An Approach Based on Cognitive Techniques.
18. Chapter 5 in "Metrics for Software Conceptual Models". M. Genero, M. Piattini and C. Calero Editors. p: 161-206. Imperial College Press, UK. 2005.
19. Systems and Software Verification: Model-Checking Techniques and Tools, by B. Berard, et al
20. Alan Burns and Andy Wellings, "Real-Time Systems and Programming Languages", Addison-Wesley, 1997

21. The RAISE Development Method, The RAISE Specification Language
22. The B method
23. Core web programming, Marty Hall and Larry Brown
24. Aho, Ulman, Sethi: Compiler & Interpreter
25. Model Checking , by Edmund M. Clarke, Orna Grumberg, Doron A. Peled various plus papers

Q12. *Did you supervise any students to earn postgraduate qualifications related to the area of your fellowship?*

1. No: 79%
2. Yes: 21%

Would you recommend any of those students for a UNU-IIST fellowship?

1. No: 55%
2. : Yes: 45%

Q13. *How many (international, refereed) publications do you have since your fellowship?*

- 40 (2 people), 4 (6 people), 56, 5 (2 people), 24, 2 (12 people), 20 (3 people), 22, 47, 8 (3 people), 13, 1 (13 people), 21, 7 (3 people), 14, 3 (5 people), 10 (2 people), 21, 16, 14 (2 people), 11, 15, 7
- Total: 568 publications

Q14. *Any other career development since your fellowship?* Answers are:

- Obtained a ph.d., have become research fellow 1st (highest) grade. Been in private sector since I finished my PhD.
- Research Fellow in Singapore-MIT Alliance before Lectureship in UK
- I am currently doing industrial MS degree in computer science in USA
- MSc in Computer Science (2001), European PhD (2005)
- I have started doing research at Formal Methods and Functional Programming. I have written 2 papers about it.
- Pursuing PhD and still doing it.
- Have become more focused on application of formal methods to industrial systems.
- Postdoc Fellowship at UNU-IIST with the e-Macao Project
- Still looking forward for a fellowship opportunity with UNU-IIST
- I have been a vice president of Guizhou Academy of Sciences since 2003.
- ICT Curriculum Development (Mongolia); ICT Education (Korea) my PhD school Teaching, Research, Development: Network, Programming Languages, Databases, Software Engineering, Security

- PhD, Postdoc, Associate Professorship postdoc research fellow at NUS between March 2005 and April 2006
- Obtained a PhD (Computer Science) [with Commonwealth Scholarship] At the University of Aston In the U.K.
- I am now Dean of Faculty of Information Technology
- After visiting Macau and University of Calgary through UNU sponsor, I enrolled and obtained a PhD in Software Engineering at the University of Calgary with specialization in Formal Methods improve my teaching skills and knowledge on teaching methodology in higher level, since my job has been given teaching for the graduate students not post graduate students, hopefully there will have master course in IT very soon, I may join them on that course too!
- PhD study at University of Kent
- I published one Paper on My fellowship work Ph. Licentiate from KTH, Sweden, 2001.
- Worked as Research Scientist in Fraunhofer Institute, Germany for three years.
- Principal of Kathford International College of Engineering and Management, Nepal
- I got my PhD degree (VERIMAG, France) and research positions after that in Uppsala Univ. (Sweden), INRIA/IRISA (France) and currently at Univ. of Oslo (Norway).
- I obtained a Master degree in Computer Science in 2003, and I'm a doctorate student at Universidad de Castilla La Mancha, Ciudad Real, Spain. I plan to present the PhD thesis at the end of this year.
- Defended doctor thesis
- Finished university degree
- I completed my master degree in July 2004. Currently I am postdoctoral of Peking University of China.
- I got promoted to Technical Manager. I went to USA and got employment in Motorola. I was back to India and working in Sun, Microsoft (.NET) and Embedded technologies. Now I am in France to do project scoping from Infotech Enterprises Limited. I am handling projects in those technologies.
- I got a PhD fellowship and currently I am a PhD student
- Doing Ph.D.
- I am doing PhD. study
- Postgraduate studies, research activities, and teaching postgraduate courses
- HPC System Manager
- I obtained a PhD after my stay at UNU-IIST

Total: 16 fellows obtained PhD degree after their UNU-IIST fellowship.

Q15. *Are you interested in organizing a UNU-IIST event in your country?*

- No: 47%
- Yes: 53%

Q16. *Have you been in contact with UNU-IIST during the last 12 months?*

1. with fellows?
 - Yes: 66%
 - No: 34%
2. with academic staff?
 - Yes: 70%
 - No: 30%
3. with administrative staff?
 - Yes: 44%
 - No: 56%

Q17. *Do you need any further help from UNU-IIST?*

- No: 42%
- Yes: 58%

Q18. *Would you like to have another fellowship with UNU-IIST?*

- No: 50%
- Yes: 50%

Q19. *Would you like to be in contact with other former fellows? If so, do you have any suggestions for how this could be organized? Answers are:*

- Yes, I'm open.
- I'd like to contact with the former fellows. However, the email filter system in UNU-IIST seems not so nice.
- I always get many spams from mailing list of seminar@iist.unu.edu.
- Yes. I suggest using some on line email group system, such as Google group.
- Yes.
- It would be interesting, but now I have no idea how to do this.
- Yes, I would. Maybe this could be a web page with links pointing to the current personal websites of former fellows.
- Maintain ex-fellows' contact information (at least email addresses) up-to-date
- Through a conference
- Yes, of course. Perhaps, a brief reference of each ex-fellow (such as E-mail, Current Position, Address) on a web site would help. Additionally, forums to discuss common interests might be organized from information of this survey

- I would like you to have a web page with the current e-mail and the picture of the fellows.
- Yes, for the start may be by having the list in the homepage with their current email address.
- Yes, probably by maintaining a mailing list. training, research, providing materials
- Yes, through an on line community.
- Yes, I would like to be in contact with other former fellows. UNU-IIST can facilitate this by organizing a workshop probably here in Kenya-Nairobi on yearly basis where we can meet and share ideas and progress that we are making in our areas of specialization regular knowledge sharing and capacity building training programme among the fellows
- UNU-IIST can create a group mailing list of all past fellows so we can always communicate and share ideas and knowledge when necessary
- It will be good to know the fellows and their current research interests.
- A possible forum for interaction among fellows could be academically rewarding to one another. I have no idea how this interaction can be organized. A possible model could be the way Humboldt fellows interact. It will also depend on funding that IIST gets. I think such an interaction session will also provide pointers for expansion of IIST and determine whether there is any need to shift the focus.
- Yes. It could be e-mailing list or forums at UNU-IIST web site maybe with a mail group. we can build a news group for all former fellows.
- Yes, I would definitely like to do so. I can think of different possibilities to organize this. UNU-IIST maintains a list of former fellows. We could provide their email addresses. We could also provide the information whenever a fellow joins or leaves UNU-IIST. Of course, it is the responsibility of the fellow to inform of any changes to Kitty (System Administrator). The UNU-IIST handbook could contain some procedures to ensure this.
- Direct contact with ex-fellows
- Yes, I would like
- Yes. I would like to be in contact with other former fellows. I think UNU-IIST could build a web page (like this questionnaire link) and put all the former fellows contact information on that (with their permission).
- Yes, we organise a meeting to share experiences in teaching and research.
- Yes, I like. UNU-IIST can organize workshop or meeting where former fellows can participate
- Yes. A discussion group can be created for all former UNU fellows
- If you have fellowship again I would like to have another chance to focus on the research activity in any kind of the topic in my area, in any universities of the UNU-IIST to obtain any certain level of master course or PHD
- Yes. I suggest UNU-IIST establish a address list for the former fellows on Internet.

- UNU-IIST arrange the one honorary school for the former fellows send us a hard copy of the alumni record regularly
- Yes. UNU-IIST may organize some reunion or workshop in Macau so that former fellows have a chance to get together. Of course YES. Creating UNU-IIST alumni mailing list, website and forum.
- If possible I think it could be nice to have a meeting at least once in order to promote future research collaboration. This could be done, for instance, by organizing a workshop by invitation where each fellow present their current work.
- Yes, I would like to be in contact. A possible organization was suggested in item 17. yes, set up an email group for former fellows or organize a bbs board for discussion.
- I would like but I think, it is difficult. something like bbs or newsletter.
- Yes. But at present I don't find out a feasible way yet for it.
- Yes, I think this could be very interesting.
- I suggest to open a former fellow forum where one can register, discussion and chatting with others.
- There is former fellows association started when I was in UNU-IIST (March 1998.) I am not receiving any information regarding its activities. Could you please update me with its activities
- Yes, I'd like to contact with them.
- I think UNU-IIST should establish a BBS for all the fellows to log in and chat. Meanwhile, a full-time person should maintain and update the incoming information. At least, a link of the pages including former fellows information should be provided on the first page of UNU-IIST website.
- Yes, I'd like to contact with them.
- Yes. The Alumni Association was at the beginning trying to play somehow this role. Its important to promote this attitude while fellows are working at the Institute.
- May be an on-line forum can be an idea.
- Sure, I want it very much.
- If it's possible, the name list of all the former fellowships are listed on the website of the <http://www.iist.unu.edu/> or we can get the address books of us.
- Yes, I'd like to keep in touch with other fellows. Whether it is possible to open a special area in the web site of UNU, something like a forum, so that we can publish our news and update our new personal information.
- Meanwhile, we can discuss something about research through this forum.
- Of course yes! I hope I can attend some parties that can get together with other former fellows.
- Provide more opportunity for communicating with each other to former fellow
- Yes.I'd like to contact with the former fellows.suggestion, to setup the corresponding BBS for contact.

- Through UNU-IIST
- A workshop can be organized in Macau where fellows are invited to give presentations.
- Maybe a special email-group can be created only for ex-fellows and current fellows contact.
- Fellows which have the same interest area may wish to discuss and exchange ideas. That can be organized via the Internet. IIST may start up some forums and encourage the former fellows to join in.
- Yes. We could have a newsgroup and an alumni website.
- Yes, I would like to contact with other fellows. It is better by organizing the workshop or conference.

20. *How often do you visit the UNU-IIST website?*

- daily: 12%
- monthly: 41%
- occasionally: 46%
- never: 1%

Q21. *What kind of information in the website do you like the best?*

1. news and events: 50%
2. reports and dissemination: 36%
3. general information: 10%
4. UNU-IIST Reference Handbook: 4%

Q22. *Do you have any suggestion how UNU-IIST could improve/adjust the contents/subjects of its training courses?*

- It might be better if our institute can offer a course on the overall background on formal methods, stressing on why formal methods, where we can apply them, and what is the underlying philosophy as well as the limitation. I believe that the students who can successfully make use of formal methods in their future career are the ones who know where formal methods can NOT be applied. Hence it is quite important to tell students where is NOT suitable for applying formal methods.
- Survey is a good idea.
- Many developing countries are in need of strong developers besides strong faculty members.
- Whatever UNU-IIST has it's great. I think it should add some programs that has strong development type of activities. I would like to go with the approach that is practiced in USA. This is one of the reasons why I came here for industrial type of master's degree in computer science. Now, I am working as a software developer in an industry here. I sacrificed the relationship with my home institution in order to gain this experience. When we go to classroom we need both theory and practice. We are handicapped if we don't have both. It's a lot easier to work in a developed country than in a developing country if one is serious in his/her work.

- Current courses seem OK
- May be on-line courses will help.
- More emphasis on the use of case studies and increased lab time.
- Yes, UNU-IIST should make the training courses to be purely research based. The trainees should be involved in research and the end of the course one should be awarded either a master degree or a PhD that is research based. Research is very important and many trainees are not aware about this. the training should always target current issues in UNU-IIST focus areas
- Very much okay the way things are organized
- e-government, database security
- Yes, as I indicated the training courses and contents should be oriented to bring in a balance between theory and technology. Distributed computing (including grid and mobile computing), Internet technology, sensor networks, wireless communication, etc., can be a part of curriculum.
- The training courses are fine.
- Spending more time in examples and SW applications
- Better monitoring and use of trusted fellow. Need to assist fellow in order to disseminate the knowledge gained during fellowship.
- UNU should help sponsor more courses in developing countries.
- In any training or programs that UNU-IIST should have any proof as certificate for proving to the organization after finishing those programs, please being considered on it, because in some countries need to give the proof to the organization after finishing program of UNU-IIST
- I suggest the training courses can relate to some real research projects.
- Please use the updated knowledge and techniques.
- To make the training courses more efficient, I suggest to use the local language, rather than English only.
- I'm not sufficiently informed of the current curricula of the training courses to give any opinion.
- Training courses are normally designed as per the knowledge of UNU-IIST fellow and not adjusted according to local targeted group's level. So, while designing/conducting the training courses, maximum input should be taken from local coordinator.
- I don't know how was the development of the courses after I took it in 1997. I was quite happy with the courses at that moment.
- I think to adjust or improve the contents or subjects empirical studies like surveys (through questionnaires or interviews) are important and can be conducted to start new designs.
- It is rather boring to take the course for half or the whole day. Two or three hours each day is good for a fellow to take in UNU-IIST. In my opinion, contents/subjects of UNU-IIST courses are very good. The courses should be a little bit more oriented towards practical application of computer science

- Provide some on line courses, besides.
- They can widen the range to the relevant fields which can make the current subjects develop more rapidly.
- I suggest that one or two senior researchers in UNU-IIST can offer courses which can give us a relative complete theory and show us some promising research topics. Through such a kind of training, we can come into the station quickly.
- More interactions between fellows and speakers in training course,
- More discussion between them after the courses.
- Diversity of training form
- The training course and the contents are good enough.
- Structure publications in Technical Reports, conferences and journals papers.
- It's quite okay.
- Raise information that the UNU-IIST can provide and collect what the host people need, then select the topic before the course take place.
- At the time when I was a fellow, it seemed to me that a broader selection of topics would have been desirable. Things may have changed since.

Q23. *What subjects would you suggest the UNU-IIST training programme should focus on?*

- Formal verification
- Software development method, extreme programming, UML
- It might be better to introduce more basic courses on computer science.
- Theorem proving and model-checking with the latest tools and methods, such as Coq and PRISM.
- No suggestions. I think the programme is already excellent.
- Formal methods, especially in software verification and validation, static program analysis
- We should find the current need of universities/ countries and try to help them. These need change as time passes!
- In my opinion, semantic Web and web services deserve some consideration; and there is nothing
- Focusing on data bases, which might be an interesting subject. I'm not sure about training but you could consider researching on those areas. For training, I would analyse the needs of developing countries, i.e. a RAISE course is very interesting indeed but in some countries there is no idea about what software engineering is (based on my own experience lecturing RAISE in Honduras, 2001). That time, the software project management course was received with much more interest.
- The point, I think, is how to help improve developing groups; and probably it should be done gradually, with some training programme (set of courses according to profiles) instead of with a group of courses.

- Modelling languages
- Industrial case studies
- Applicable or Industrial-Strength Formal Methods (e.g. Model Checking), Programming Languages, Algorithmics and Project Management
- Formal methods, distributed computing, open sourcing, human computer interface and research methods. software dependability and security
- Programming
- Software Engineering, Distributed Systems
- Formal methods
- A world class institute is either known by its product (students/fellows) or by its research. I think UNU-IIST could be perhaps be outstanding in both counts by expanding its research areas with a balance between theory and technology.
- Software Engineering
- Model Driven Architectures, Web Services.
- Design Techniques for Real-time Embedded Systems;
- Formal Models for Security ;
- Open Source Software Development;
- Models for Internet-based Programming,
- University Development;
- Hardware/software Codesign ;
- Formal Methods for Object and Component Systems
- Applied research that will facilitate application of advance technology to solving local problem. E.g. how modelling and simulation of machines for local food or textile products, etc. uniform meta-language for specifying, implementing, and proving properties of programming languages and logic
- Formal specification of real-time systems
- Some of the new updated in the world and some difficulties experience and solving on IT and programming occurred in practical, Networking experience, network security and so on..
- Software development software development methodology
- Formal methods
- I'm not sufficiently informed of the current curricula of the training courses to give any opinion. It depends on the expertise of UNU-IIST academic staff.
- Emerging technology.
- As someone working on verification I could suggest to focus on formal specification/verification of distributed systems (including some of the usual theoretical/practical problems of Internet, web-services and security), but I have no particular opinion about it.

- I was happy about the theoretical courses I took on specification and duration calculus, which was a good combination of theory and practice. In my opinion UNU-IIST should concentrate on training programmes which are not well developed in the countries it works in.
- I think that a subject of interest in the last years is Model Driven Architecture (MDA), and model transformation of platform independent model (PIM) to platform specific models (PSM). Also the use of the Object Constraint Language (OCL) in UML modelling, in meta modeling, etc.
- I think the code generation and formal specification is one of the more important subject which UNU-IIST always focused on.
- The development of software through MDA can shift the software paradigm in the next years. May be the know-how of research fellows in formal specification and code generation can be applied in MDA topics and in transformation of PIM to PSM and from PSM to code. UML is an international standard for Object-Oriented software development, and in the current version of UML the importance of formal specification through OCL is becoming more important. I think UNU-IIST have many strengths and opportunities in the next years.
- Real-Time Embedded Systems
- I suggest to include some other subject such as practice, but not only theory.
- Open Source software and processes, as this is one of the hot topics in developing countries right now.
- Apart from the subjects covered in the above-mentioned question 8. I think the subject related to embedded computing should also focus on.
- Software Development with Formal Methods, UML, Tool support for Formal Methods Embedded systems, Design methodology & modeling with SCADE, Rhapsody. information security, pattern recognition, biometric applications, biometrics (e.g. fingerprint recognition)
- Software Engineering
- I think the training programme should focus on how to do good research. That is to say, it can greatly improve the research abilities of the members.
- Practical software engineering skills
- Some courses which are popular in currently practice and industry.
- Software Development with UML
- Software testing
- Security: Principles, Techniques and Verification
- Software Project Management
- Modelling
- What is there currently is OK
- Testing, and tool support for program verification,
- Computer security and Internet related technologies/frameworks.

- I think verification is an interesting topic.
- I think software development and data warehousing could be useful in our country.
- Software Engineering. Other foundational aspects of Computing
- Software Project Management, Software Development and Algorithm.

Q24. *How would you like UNU-IIST to widen its technical scope?*

- More contact with companies
- Besides RAISE, UNU-IIST should build some more tools.
- We should go for academic degrees as well if we really want to have permanent relationship with the fellows. Its the one and only one thing that guarantees a permanent relationship. Its very formal and precise!
- This is not an easy answer, and possibly some things are difficult to organize. However, it could be interesting for example to consider the following. Topics for training might be reviewed; research networks on specific topics might be organized (for example, among well-established research groups and developing groups) in such a way that consolidating researching and transferring to industry is possible after training; something like a "tracing programme" might be designed to support ex-fellows in developing clusters of research.
- By broadening its area of research, by conducting conferences, workshops.
- Algorithms and Advanced Data Structures, Theory of Computing
- UNU-IIST should have more contacts with universities in developing countries. Many of them are facing serious problems specially in getting qualified people to teach and carry out research in the field of computing.
- Creating more rooms for sharing of knowledge via conferences and seminar. Some of the conferences could be organized in various developing countries in other to share from their ideas
- Supervising Universities in deep from developing countries
- Yes, I would like UNU-IIST to widen its technical scope By periodically requesting for inputs/suggestion on technical contents of courses, workshop and seminar.
- Carry out more research on formal specification of real-time systems expending your great advantage of your program react to show some good experience to other countries. Advertise to the fellowships how could they get in touch your organization. Build up good relationship with all fellowship to gain experience on it. Reduce some disadvantage from the pass in such activities' experiences were occurred
- I hope the theory of network can be introduced
- Quite updated
- No idea. it can be adjusted according to the background of its research fellows.
- I wonder, given that I could not find this information quickly at the UNU-IIST web-site, if the current curricula includes subjects like fault-tolerance for distributed asynchronous systems, bio-informatics, grid computing and peer-to-peer algorithms.

- By collaborating with IT industries.
- Strengthen the collaboration with industrial field.
- I do not know
- Keep up with top scientists in that field.
- The academic staff should have a greater scope beyond the topics currently covered by current staff members. Not because the current topics are invalid, but to be able to provide a greater insight into more areas of computer science.
- Concentrate on the subjects which have market demand
- Like Embedded systems, Design methodology & modeling with SCADE, Rhapsody.
- Take up some new research and development projects which can attract more professional from software industry. This way you can have revenue generation and software industry can sponsor people for fellowships. You know industry looks for returns. Let me know if you have any plans of conducting training in the area of Embedded technology
- I think UNU-IIST should focus on practical programming technology a little bit.
- They can employ the more faculty from other Universities. Maybe some of the excellent former fellowships can be chosen.
- It is good to widen the technical scope to some related fields, which helps to get a wider view of research. But I think it also shouldn't be too wide, we need to focus on what we are familiar with.
- Software Engineering practice. Pay more attention to the new technology, such as Internet-oriented technology
- UNU-IIST should still keep the focus in the field of Software Engineering.
- Develop a PhD programme in collaboration with other universities (even in developing countries).
- Invite more visiting fellows to hold in-house courses.
- Security (and perhaps cryptography). I am currently working in these areas so I may seem somewhat biased. However, it is commonly agreed these days that these topics are of great current and future interest. They fit well with the general goal of UNU-IIST to provide technologies for robust software development.

Q25 *How would you like UNU-IIST to expand its activities in your home country?*

- More sites and more training courses
- Short time course
- Recruit more fellows as well as visiting scholars from my country.
- More courses... I wonder whether there will be a summer school in China this year?
- Any expanding would be nice. Currently I think how to do this.
- Besides training I would strongly suggest some packages for academic degrees as well. Many bright faculty/ students in Nepal want to get degrees from world class universities so they are definitely attracted by such opportunities.

- There are currently two universities in touch and working on the E-gov project. I think that activities from these organizations are enough, although there are many other universities that could appreciate a training course and eventually fellowships.
- I think a Summer School could be a good idea. Also another training course Our University have a PhD program for our staff called "2+1 program", where a staff will do 1 year study at foreign university (that have MOU with us) and two years locally in our university. The degree will be given by us or the foreign university. Since we have a few staff that interested to know more about formal method, I wish an introduction course can be held at our university and then an MOU can be arranged for research and also PhD.
- By conducting tutorials, workshops.
- Joint Graduate Degrees (M.Sc. and Ph.D) with the University of Lagos
- UNU-IIST can assist the government of Kenya especially on e-governance. There are serious problems in this area and the government stands to gain by utilizing and adopting e-government. UNU-IIST also can team up with universities and information technology companies here in Kenya and conduct researches that will provide insights into the utilization, adoption and diffusion of information technology in Kenya
- Organizing more seminars, conferences and sponsoring more curriculum development programs training courses and conferences
- Perhaps can create centers of excellence in collaboration with reputed teaching institutes.
- To support electronic services such as e-governance; e-learning; e-commerce etc; to organize workshop, training and other events on software development in cooperation with National University of Mongolia among Mongolian public and private institutions; to implement ICT related projects. any activity would be great
- Creating a small research center Develop training courses, Open many Conferences.
- 1. Give more courses and lectures. 2. Try to organize more conferences and workshops with institutes and universities together.
- Establish permanent links with trustworthy research. Proper monitoring of project by way of periodic visitation
- More often organise new courses
- Provide assistance in helping to organize more courses on formal methods and enable more fellows to visit and carry out research in Macau.
- Trying to build up the good relationship to my university and showing goal and policy to my organization, some best experience on educational and other strengthen in previous time to our university in Laos to know you well and finding some linking network exchange experience of each other and any project on bilateral benefit.
- Call the people for the fellowship
- Propagate UNU-IIST courses.
- seminar and workshop

- I suggest to cooperate in exchanging doctor or post-doctor training.
- I think that UNU-IIST has a reasonable level of activities in my home country.
- Joint research and course training.
- By regularly organising workshop/school/seminar and tying up with local IT industries and academic institution.
- As far as I know there has been no course in Uruguay yet (I took UNU-IIST course while taking my M.Sc. in Brazil). This could be done by organizing a course like the one I took in Brazil in 1997: two weeks with two or more courses.
- Through the organization of events, courses, etc. May be through a joint organization of a congress, or international schools, etc. Supporting research groups of their ex-fellows, etc. give courses, presentations, hold workshop, conference.
- Organize training classes (one time/year)
- UNU-IIST could collaborate more with German universities, e.g. in procuring PH.D positions for former fellows from developing countries.
- May be by giving courses more often or collaborating in projects in the country
- Provide more scholarships for young teachers to visit excellent universities in developed countries.
- I wish UNU-IIST could provide Vietnam with more fellowship and textbooks.
- Very much. I think mail some materials, such as training contents, seminar stuff, etc, to the libraries of universities world wide.
- Having a center for planning and carrying out joint activities, such as research projects, schools, etc. introduce the UNU-IIST to them, which can let them know something about UNU-IIST ; Organize them to do some research in relevant fields; make them contact with UNU-IIST
- It is good to widen the technical scope to some related fields, which helps to get a wider view of research. But I think it also shouldn't be too wide, we need to focus on what we are familiar with.
- Summer school can be held in more regions of China.
- Give more course to the younger professor and graduate students in the university
- To have more seminar and training course
- By organizing training courses in all areas.
- By offering fellowships and setting up a framework to collaborate with local universities and research centres.
- Hold more summer schools and conferences.
- In Vietnam, I think UNU-IIST may cooperate with universities or education organizations to provide more training programs/subjects
- Co-operate with the local university to organize the courses and training their young staffs.

Q26. *Do you have any comments on the UNU-IIST fellowship application procedure?*

- It is quite fine.
- No, it is excellent.
- Fellow identification procedure is OK I think. There should be some opportunity for people even if they don't know any of the staffs there at UNU-IIST. Not everyone in this world gets chance to visit UNU-IIST staff! I am referring to an opportunity similar to one that is available in USA. It welcomes everyone provided that person is qualified! One remains in a position as long as one can maintain his/her status. One gets paid very high amount as long as he/she works satisfactorily! This is how USA attracts good people. May be UNU-IIST can incorporate some of these (I understand everything cannot be implemented outside USA) if not all. I also understand that UNU-IIST is not a business type of university but the reality is it has to compete with big business universities in the world. Well I think that if you do not have the option to attend to a training course or a summer school it is very hard to have contact with UNU-IIST and to have the opportunity to be a fellow. I would like you to have another way to contact some other people.
- The UNU-IIST fellowship application procedure is good. There is no discrimination. The requirement are applied equally to any applicant.
- UNU-IIST should always respond to all applications whether positive or negative
- Did not check the current procedure. So not in a position to comment.
- I think it will be more convenient if UNU-IIST can have a online application system.
- The present procedure is okay.
- All procedures are well done.
- Application is alright
- The current system is good, I think.
- No comments. It's fine.
- I am not aware about the current application procedure. I think it was good when I applied.
- No. I think the application procedure is correct.
- As I don't originate from a developing country, I can't comment on that.
- No, I think it's fine.
- It is fine
- Excellent
- I feel satisfied with them, so I have no comments.
- Let more students, all over the world, to know there is such a nice chance to get fellowship in UNU-IIST.
- Good
- The fellowship application procedure is flexible and resilient enough.
- It's quite okay.

Q27. *Any other comments on improvement of UNU-IIST activities?*

- Finally, hope UNU-IIST happy everyday!
- I would like to thank UNU-IIST for the opportunity it provides for developing countries. I think it should try to establish close ties with the big universities in USA and Japan as well as I don't see the names in the list. UNU-IIST is spending money, my point is why not spend that money with the leading universities of the world. As UDP program does not give degree it should be possible to send fellow to any university in the world (as UNU-IIST pays). There should be some filtering mechanism with UNU-IIST. Depending upon how smart a fellow is UNU-IIST should send fellow starting right from MIT, Stanford, Carnegie Mellon, Cambridge, Oxford, etc. For example my colleagues in Kathmandu University, they already follow MIT-open course ware system. When they visit such institution they have opportunities to see other resources as well. US is more than happy to train people when people come with their own resources. US applies filtering criteria when it has to pay (makes sure that expenditures are returned back). I believe that UNU-IIST should do some screening before sending to such big universities or train prospective fellows before sending there. It is true that fellows after reaching such universities/ countries may not return. UNU-IIST should have some plan for that. I strongly believe that UNU-IIST should give best opportunity available to the fellows and it should have full control of fellows's visa status. Many developing countries don't have fair procedure to utilise fellows. UNU-IIST should make the plan by consulting with international experts (this committee can include members from developing countries as well). YOU GIVE BEST OPPORTUNITY AND YOU ALSO POSSES CONTROL OVER THEM (exactly like in USA). I will be more than happy to be in such system! And I can motivate many bright people to be part of that system. Let people think about opportunities available rather than think about breaking laws in order to get most suitable opportunity/ match.
- Use of ex-fellows in facilitating UNU-IIST activities regionally.
- UNU-IIST should be involved more in carrying out research in African countries and other third world countries to get insight into the utilization, adoption and diffusion of information technology. Such information will enable UNU-IIST to make informed decisions regular training for previous fellows
- UNU-IIST should sometime open the new training courses for Ex-fellow.
- Things have changed and the value of the US dollar has also depreciated but UNU still uses the US dollar as a standard, with the result that fellows find it difficult to live during their stay in the host country.
- UNU could do well to revise its exchange rate.
- Exchanging ideas with fellows.
- Make the contents of training courses easily accessible from the web-site. It is too long after I leave UNU-IIST. In this case, it is very hard for me to make any valuable comment or suggestion.
- Industrial projects should be carried more rather than just pure research work.
- As far as I know, UNU-IIST has been quite active in Asia and a bit less in South-America and Africa. I would suggest to promote more activities in South-America

and Africa.

- As mentioned above I would like to participate in training courses in Uruguay and eventually in other Latin-American countries.
- When I was fellow the organization of UNU-IIST activities was very high. May be, outdoors activities can improve the integration of the fellows when they are doing fellowships at UNU-IIST.
- Nevertheless, I think the standard of the accommodations, UNU-IIST offices, the library, the procedures applied, etc. is very high. The research fellows were (and are) very good also. Administrative staff were very polite with all of us.
- When I was fellow the organization of UNU-IIST activities was very high. May be, outdoors activities can improve the integration of the fellows when they are doing fellowships at UNU-IIST.
- Inform former fellows if there is courses (presentation) taken in their country.
- UNU-IIST should try and get engaged in the "One Laptop per child" project.
- I think these comments do not fit here, but I would like to express them. I want to say I am very grateful to UNU-IIST and all its people for the opportunity I had.
- The fellowship was a wonderful experience which influenced quite a lot in my way of working.
- The Joint PhD Programs you offer now are excellent opportunities for people from developing countries to have the possibility of making postgraduate studies in prestigious universities with all the support UNU-IIST gives.
- As I said if you can generate more revenue you can pay more stipend. Many organizations will know about UNU-IIST. You can get more pilot projects from software industry
- I feel UNU-IIST should work in line with software industry. Hire high broadband connection from Macao Telecom. Since the website of UNU-IIST is too slow to visit for users outside Macao.
- Intensively suggest naming Dr. Liu as the President of Recreation and Sports Dept. He has full of ability to inspire fellows' potential energy and refresh us. :)
- Send out updates monthly about news and activities in UNU-IIST to current and previous fellows. Or set up a mailing list to subscribe.
- Keep closer contact with former fellows
- UNU-IIST should invest more in mainland China, who is now in rapid progress in Information enterprises, the biggest market in the field, that which will keep UNU-IIST in the first place.
- If it can become larger, that will be better.

4 Acknowledement

We are very grateful to all the former fellows who contributed to this survey. Their suggestions and comments are being considered now and will be reflected in future activities of UNU-IIST.

We are pleased to announce that Dimitar Guelev, Marisa Sanchez and Suman Roy are the former fellows who won in the lucky draw for this survey. Each of them will get a prize worth USD 150 which will allow them to purchase books to that amount.