Jack-Of-All-Trades versus Master-Of-One – Strengths and weaknesses working in Multi-disciplinary Computing

Maria Salama
University of Birmingham,
Birmingham, UK
m.salama@cs.bham.ac.uk

Mariam Kiran
University of Bradford,
Bradford, UK
m.kiran@bradford.ac.uk

Poonam Yadav
Imperial College London,
London, UK
p.yadav@imperial.ac.uk

Amel Bennaceur
Open University,
Milton Keynes, UK
amel.bennaceur@open.ac.uk

Lilia Georgieva
Heriot-Watt University,
Edinburgh, UK
L.Georgieva@hw.ac.uk

INTRODUCTION

Software is evolving at a phenomenal pace and changing the way we live our lives [1]. Software is facilitating connections among different platforms, e.g. web services, mobile applications, off-the-shelf products and plays a key role in interdisciplinary applications, such as understanding economic data, medical diagnosis and patient monitoring, reliability, safety and risk assessment, data mining in biology or predicting user behavior for marketing products. Software components are reusable in multiple tools, promoting understandability, adaptability and portability [4].

Recent scientific studies have found the women are better at multi-tasking compared to men and better at organizing tasks, capable to rapidly switch between them [2, 3]. Because of this, female computer scientists are often working with multiple teams, on multiple projects and across disciplines. The challenge is that such multi-discipline working can be perceived as a discipline hoping and flagged as a weakness and as a result hindering promotion prospects. This raises questions on the nature of research in software engineering, where there is a need to work across disciplines and simultaneously be focused, a concept which most computer scientist male and female both struggle. The recent Athena Swan [5] report has found there is a proportional underrepresentation of female scientists at senior positions in UK universities. The reasons for this were identified as lack of mentoring and awareness of focused vs multidisciplinary research contribution. This is a pattern which has been repeated across the different fields internationally [6] with only 14% female vice chancellors, 1.3% brigadiers in the army and 34% senior civil service women. This proposal is to explore the issues surrounding inter-, intra- and multi-disciplinarily for women in computer science and to highlight the importance of mentoring. Software supports multiple fields and thus there is also a need to rethink how computing research is viewed in major institutions. The event will explore the advantages and the pitfalls of engaging in multidisciplinary research, and discuss solutions on how best we can manage personal career goals so that progress faster to more senior positions in academia. The discussions will also cover initiatives taken by STEM and the governments to influence female numbers in senior positions. We will also discuss the lack mentoring and guidance unavailable to junior scientists. The event will be run as an interactive session with the following topics:

- Highlighting examples of female contributions to the computing field.
- Asking for inspiring stories from attendees.
- Discussing how computing is different than any other STEM field, using example of software engineering.
- Highlighting the challenges of becoming senior members at an institution where the glass ceiling is preventing this.

AUDIENCE

The event will be particularly targeted towards early-stage researchers, students and people thinking of switching between academia and industry. We will also invite panel members such as professors, scientists working with multi-disciplinarily fields to discuss their view on this problem and how to address it, we will present clear objectives on what is needed needs for females to progress in the field in order to attain their career goals within their institutions, both in academia and in industry.

PLAN OF ACTION

This event will act as an interactive discussion forum. We will organize ourselves as follows:

10 minutes: Moderators will introduce themselves and the objective, giving a brief background on issues in working in a multidisciplinary field. Focus groups will be formed to allow targeted discussions on specific significant issues. The input of the focus groups will then merge back to the main BOF. These topics are discussed in next point.

20 minutes: Small focus groups are formed by self-selecting audience members. Each group is given the point of focus and some instructions. Proposed focus points are: (1) Role of academic culture influencing female progression to senior positions (2) diversity and equality issue in computing, (3) feedback on effectiveness of initiatives in UK to support women in STEM (4) using

software engineering as one product in multiple forms (5) multi-disciplinary computing: one or cross-disciplinary.

10 minutes: The moderators will lead a discussion about the findings of each focus group. These will be put as posits on different boards.

10 minutes: Participants will be asked to go round the boards, to add input to other focus points they had not participated in.

10 minutes: The moderators will initiate an open discussion. Inspirational stories will be welcomed to be presented by the audience. Focus groups will be arranged to cover a range of geographical areas and institutions, allowing wider international insight.

In case of a higher number of attendees, we will manage the discussions by dividing attendees into groups of (maximum) 10, introducing more topics such as understanding female nature and it as an advantage, or how much behavior influence promotion prospects.

OUTCOMES/CONCLUSIONS

Attendees will share experiences and discuss issues raised in their specific environments. Attendees will gain a wider awareness of the status of computing careers around the world and initiatives taking place. We plan to synthesize the BOF experience and present results as a report (i.e. a publication from the (ACM-W UK chapter) to the UK parliament and the wider ACM community. Further results will be submitted to IEEE Journal of Education and Communications of ACM under the title "Multi-tasking in computing: Perspectives from female scientists".

PARTICIPATION STATEMENT

This BOF event is organized by the ACM-W UK professional chapter and the named persons are all committed to attend the conference.

Maria Salama received B.Sc. in Computer Science and Post-Graduate Diploma in Management Information Systems from Sadat Academy for Management Science, Cairo, Egypt in 2001 and 2003 respectively. She received M.Sc. in Computer Science from Arab Academy for Sciences and Technology in 2011. She is currently PhD student at the University of Birmingham. She was assistant lecturer in the British University in Egypt. Prior to joining the BUE, she had a solid experience in the industry, stepping from web development to project leading. Her research interests are Software Engineering, Cloud Computing and Health Informatics. She also has activities in raising women in STEM.

Mariam Kiran is a Lecturer of Software Engineering and Cybersecurity at the School of Electrical Engineering and Computer Science at University of Bradford. Kiran's research interest are in simulation and cloud computing applied to Smart Cities and Internet of Things. She is regularly experimenting with new technologies and software toolkits, and is an avid promoter of open source software. Her work involves working with other disciplines – biology, economy and social science, to provide reliable software solutions which are easy to use and using state-of-the-art research. She is a fellow of the HEA, BCS and ACM. She is also the chair of the ACM-W professional chapter UK wide. She is also a Yorkshire ambassador for promoting female careers in STEM.

Poonam Yadav is a research associate at London e-science Center and Social Computing Group, Computing Department at Imperial College London. She has contributed in different distributed computing, IoT, M2M and cloud computing projects funded by TSB, EPSRC, NERC, US Army Research Labs, and IBM Research labs. She received her PhD from Imperial College London in 2011. Her PhD was funded by prestigious UKIERI (UK-India Education and Research Initiative) fellowship. She is actively volunteering at ACM-W Europe, ACM-W UK, and Grace-Hopper India and Imperial College WSET Society to support women in STEM.

Lilia Georgieva is a Lecturer in Computer Science at the School of Mathematical and Computer Sciences at Heriot-Watt University. Her research is on using formal methods for modelling, analysis and verification. She is also an advisor to the European Commission on gender issues and integration of the gender dimension in research programs and on international cooperation, mobility and research career development for the Marie Sklodowska Curie actions. Lilia is a fellow of BCS, ACM and a member of Athena Swan group at Heriot-Watt University.

Amel Bennaceur is a research associate in the Department of Computing at the Open University. Currently she is investigating the area of adaptive security and privacy.

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