



On leadership and on leading EPSRC grants

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Outline

- **There is no Outline today!**
- **Let's all just drift away**

On leadership

- Good leaders are usually not taught leadership skills
- They **have vision (ideas and strong will)** to discover something, solve a problem or bring something to a result
- It is more of a realisation that **you cannot do everything on your own** and you need to have a team around you ... and if you are lucky others follow you
- In fact being a leader is not a trained skill, it's a personality trait.
- And you must “enjoy” leadership!

On leadership scale

- You can be a leader of a team of people working with you (**local perspective**), or/and
- You can be a leader of a community of people, even worldwide (**global perspective**)
 - There are many examples of scientific pioneers who mostly worked on their own but who inspired people and created fields of knowledge. E.g. Oliver Heaviside (2 Volumes of Electrical Papers and 3 Volumes of EM Theory)

On vision: do leaders always know?

- Leaders often have **clear vision on specific problems** (i.e. within one or two projects) but don't know how to solve them best.
- Leaders **don't always know problems** to be solved in advance (a “don't know what we don't know” phenomenon).
- Another story about the bird flock leader

**Lots of brainstorming (almost everyday!):
coffee room, corridor, pub, walking in the
park chats ...**



Leadership Role Models

- My role models:

Victor Varshavsky - pioneer of collective behaviour of automata; asynchronous circuits – led his team over 30 years (tight group leadership)

Brian Randell – pioneer of research in concurrency and dependability – created and led systems research in Computing for 30+ years (wider group leadership)

David Kinniment – pioneer of research in metastability, arbitration and synchronization as well as VLSI design – led MSD group at Newcastle for 20 years (medium size group leadership)

Steve Furber – pioneer in RISC, low power, embedded and later massively parallel computer architectures – led Amulet and then APT (varying size group leadership) and of course the UK electronics community

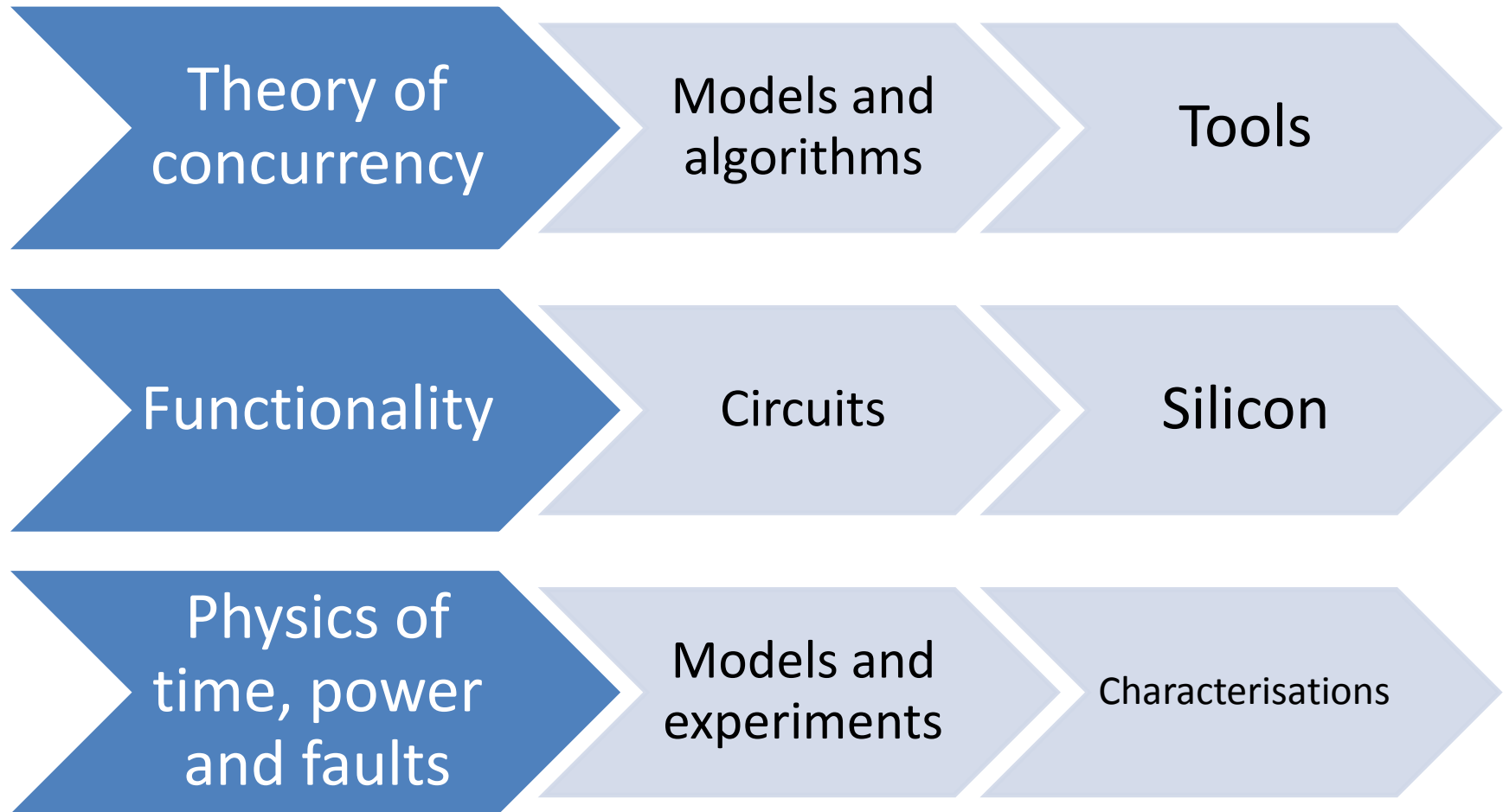
Other leadership models I have learned from were Peter Cheung (Imperial), Simon Moore (Cambridge), Andrew Brown and Bashir Al Hashimi (So'ton), Anthony O'Neill (Newcastle)

- What is common in all these cases – there was **no hierarchy** between the leader and researchers at all levels – the leader worked with most junior students! And had significant global leadership.

On “golden ratio” in your team

- It is important to identify **fundamental long term challenges and goals (hypotheses)** – at physical-philosophical level
- It is important to **combine a number of types of activities or concurrent threads in research**, so that bright people, yet of different traits and talents, would be able to realise themselves and progress in your team
- I.e. don't just surround yourself only with mathematicians or programmers or engineers or biologists or entrepreneurs ...

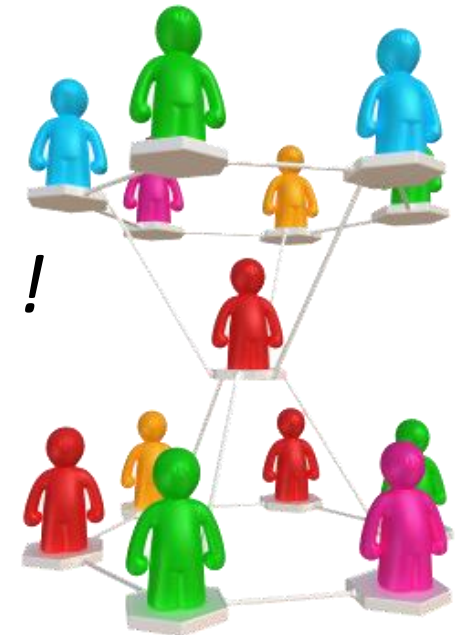
My three main research threads



On Management

- Very important (especially if you want to be effective on reaching the targets)
- But this talk is not about project or team management
- And ... confession:

I am not sure I am a good manager !



My own experience

- It covered a period of 1991-now at Newcastle
- I had an early academic career in Russia from 1982, which was also a good experience as I worked with brilliant researchers and saw some leadership examples
- Let's now look at my Newcastle career ...
 - 1991-2002 (CS – head of VLSI Design research group)
 - 2002-now (EEE – head of Microelectronics Design and later uSystems group)

The very start

- 1992-93: I got a Newcastle University Research Council PhD studentship (2 years after becoming a lecturer)
- Then I also build excellent links in Newcastle with Maciej Koutny (CS – head of theory of computing group) and David Kinniment (EEE – head of MSD group)
- Plus I developed excellent UK and international contacts in Manchester, Cambridge and USA, Japan, EU, for which I had some modest travel cash from EU (Working Group)

EPSRC Grants

- 1994-1997: My EPSRC start funding was to be a (lead) CI on a two-site project between Newcastle and Bristol
- Newcastle PI: David Kinniment
- Bristol PI: Eric Dagless

PIs – two established Profs

Lead CIs – who mostly wrote the proposal – were ECRs

Then, shortly after, as a PI I had two visiting fellowships to build my close collaborators from Italy and Japan

Then, in some 3-4 years by 1999: I was leading 3-4 EPSRC grants of a size of 1 or 2 RAs.

Alignment with UK, EU and international collaboration

- As a backup I had a steady EU funding (small in size but very influential) – a partner in a Working Group (ca. 25K a year of travel money)
- Plus several grants from Royal Society, British Council
Those constantly helped my UK and international collaborations, networking and leadership
In combination with EPSRC grants this gave me two important dimensions:
 - International co-workers
 - Local PhD students and postdocs
- Organising and PC chairing workshops and conf's was also important

When I applied for a personal Chair

- This was my CV then (1999, I was 43):

<https://www.staff.ncl.ac.uk/alex.yakovlev/home.formal/mycv99.alt.pdf>

- Funding portfolio:
 - EPSRC grants (173K+162K+126K+120K+6K+6K = 593K as PI plus 120K as lead CI) – total 720K
 - EU, RS, BC, Leverhulme, URC – total 100K
- Publications: ~20 journal, 30 confs, 2 edited books
- Built (jointly with Maciej Koutny, CS) our own Newcastle-based permanent seminar – Asynchronous Systems Lab (ASL), which lasts until now! – **establish your long-term seminar!**
- In 2000 went for young talents to Kyrgyzstan (via TEMPUS projects) and found a wealth of them (Danil Sokolov, Andrey Mokhov and many others) – **look for talents everywhere in the world!**

Bi/multi-site projects

- In the period from 2000 it was good to have joint projects with another university partner (and companies):
 - Kings College London (MBDA)
 - Manchester, Edinburgh (Intel)
 - Southampton (ARM)
 - Bristol (TI)
- Then (from 2010) there came large EPSRC grants (e.g. Holistic) – involving 4 Universities (Southampton, Imperial, Bristol and Newcastle)
- Such collaborative projects help building your UK network and making new friends for life
- But always try to identify clearly and maintain your team's role in them!

Golden era of EPSRC funding in Electronics: 2004-2010

- Followed this brilliant effort of Steve Furber and few other leaders
- Many responsive mode projects, of varying scale came out
- Later it span out initiatives like e-Futures

Design Vision

Grand Challenges in Microelectronic Design

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Andrew Brown, University of Southampton
Steve Furber, University of Manchester
Roger Woods, Queens University Belfast

The UK microelectronic design research community comprises diverse groups occupying many different positions across a vast spectrum of research interests: projects range from novel biologically-inspired systems through to Systems-and Networks-on-Chip, from high-level behavioural synthesis tools (silicon compilation) to low-level analogue circuit techniques. Strengths in academic research complement strengths in the UK design industry.

Following a series of open meetings under the heading of "Developing a Common Vision for UK research in Microelectronic Design", a strong consensus emerged that the subject is centred around a number of core technologies and that these can be focussed coherently under a set of Grand Challenges. An open call for Grand Challenge proposals yielded a set of strawman outlines that were refined into the four Grand Challenges that will be described in this talk.

μGC1: Batteries Not Included: Minimizing the energy demands of electronics

μGC2: Silicon meets Life: Interfacing electronics to biology

μGC3: Moore for Less: Performance-driven design for next-generation chip technology

μGC4: Building Brains: Neurologically-inspired electronic systems

Era of Programme Grants

- Two Programme Grants (ca. £6M each):

PRiME (Southampton – PI: Bashir, Imperial, Manchester, Newcastle) 2013-2018

POETS (Southampton – PI: Andrew B, Cambridge, Imperial, Newcastle) 2016-2021

Just applied for Real Power (Newcastle, Southampton, Imperial, Bristol)

Platform Grants

- With Anthony O'Neill (PI) on Materials, Devices and **Systems Design**
- With Alexander Romanovsky (PI, from CS) on combining CS and EEE problems in **systems design (esp. low power and timing)** and formal methods

Fellowships

- I have tried once to go for a Senior EPSRC Fellowship and reached the final interview stage – 6 out of 10 were selected; I wasn't one!
- EPSRC Dream Fellowship (2011-13) – successful! Excellent experience: discovered new areas of research in energy-modulated computing. This took me to study power electronics, electromagnetism (started another new seminar NEMIG – with Chris Spargo, a PhD student then – now academic in Durham), life of Oliver Heaviside ... Filed a couple of patents
- And that was mostly about **leadership, creativity and complete adventure!**
- Yet, my commitment to being head of group somehow stopped me from going for other fellowship applications (such as EU ERC – had some long thinking!)

Key elements for success

- Build a team where all aspects of talent have a chance to develop and flourish
- Build a team, both locally (your work place) and globally (worldwide)
- Try to focus long term on fundamental challenges: For me, Asynchronous Systems research has been a wonderful area, which combined the three main threads and different people in:
 - Computer programming
 - Electronic (Circuits and Systems) design
 - Theoretical analysis
- And never be afraid of looking ignorant, go for new areas, ask questions, interact with all kinds of people – even UG students – as equals, and this will help to spot new talents - whether they will be in your team or elsewhere!

What proposals scored best

- Proposals on:
 - Low latency asynchronous synthesis and testing (STELLA), completely fresh ideas, very focused
 - Asynchronous design for security (SCREEN and SURE), supported in cash by Atmel Smart Card ICs
 - Asynchronous design for analog (A4A), supported in cash by Dialog Semiconductor
 - Reliable cells for synchronizers (with Intel) – small and focused
- In most cases, ideas were fresh, crystal clear. Industrial support was evident.

Be dynamic and resilient: changes and failures are inevitable

- One grant GAELS (Globally Asynchronous Elastic Logic Synthesis)
 - First version was quite different and was with Bristol and involved some physical level design part. Reviewers didn't believe in that part
 - 3 years later I resubmitted but a fairly different one with Manchester plus two partners (IHP and Intel) and it went through.
- That was probably my only example of resubmission ... I don't usually recommend that, but changing a partner may be necessary
- Be ready to have multiple rejections – it's painful but having colds and flu's, that's part of package called your career!

Thank you!