Proposal Writing 101

(a review for some of us)

Disclaimer

- My opinions and mine alone
- I tend to be direct – please don't be put off
- Feel free to disagree with me

Resources

- www.followthatpage.com/
- www.researchprofessional.com/

Before You Start Writing

- Develop your ideas
  - brainstorm w/ trusted colleagues
  - research background if this is a new area
- Talk to people
  - colleagues who have served on panels
  - colleagues who have received funding from the agency you target
  - people AT the funding agency
- Learn about the funding program
  - different agencies have different formats/expectations
    - VR described here
    - SSF has more directed programs (so echo their language)
    - Vinnova is a different beast
    - STINT has a different focus (make it clear how you further THEIR goals)
    - ERC has specific rules and expectations
    - EU likes to kill trees and they like you to echo their language
    - MARIE CURIE also has specific rules and expectations
    - corporate funding proposals are different still
  - there are lots of advice docs out there (your mileage may vary)
- Get examples of successful proposals
  - from colleagues
  - from the agencies themselves (government agencies support freedom-of-information)

My Five Questions

- What's the problem?

- Why is it important?

- What's the shape of a solution?

- Why will it work?

- How will you show that it works?

Why Me?

- 1. Vetenskapsrådet (VR), "FlexSoft: Software Infrastructure to Support Hardware/Software Codesign of Exposed Architectures", 2,400,000 SEK, PI S.A. McKee, 2012.

- 2. NVIDIA Corp., Academic Partnership Program, 30 GeForce GTX480 cards, 2011.

- 3. EC HiPEAC Network of Excellence Compilation Cluster, "Hardware Support for Managed Languages" 12,000€ collaboration grant for travel to interact with Christian Probst, Sven Karlsson (Danish Technical University), 2010. (Supplemented by a Danish government grant to include Lixin Zhang (ICT, Beijing) and Michael Franz (UC Irvine)).

- 4. EC 7th Framework Programme 249059, "Embedded Reconfigurable Architectures", Chalmers portion 256,332€, main PI S. Wong, co-PIs from Delft, Uppsala, Siena, Edinburgh, Federal Univ. of the Rio Grande do Sul, Evidence, ST Microelectronics, IBM Israel, 2010.

- 5. Ericsson AB, "Smarter Resource Management for Baseband Processing ", 880,000 SEK, PI S.A. McKee, 2009; extension 250,000 SEK, 2011.

- 6. Vetenskapsrådet (VR), "Chalmers Adaptive Multicore Processing Project (CHAMPP)", Co-PIs P. Stenström, P. Lars-Edefors, S.A. McKee, L.J. Svensson, 11,142,000 SEK, 2009.

- 7. EC HiPEAC Network of Excellence Adaptive Compilation Cluster, 10,000€ collaborative grant for travel to University of Siena, PI S.A. McKee, 2008.

- 8. NSF 0750851 "CRI: CRD Collaborative Research: Archer — Seeding a Community-Based Computing Infrastructure for Computer Architecture Research and Education", main PI R.J.O. Figueiredo, co-PIs J.-K. Peir, J.A.B. Fortes, T. Li, P.O. Boykin (Univ. of Florida), G.S. Tyson (Florida State Univ.), L.K. John (Univ. of Texas at Austin), D. Kaeli (Northeastern Univ.), D. Lilja (Univ. of Minnesota), G. Memik (Northwestern Univ.), S.A. McKee (Chalmers Univ. of Technology), 2007.

- 9. DOE Lawrence Livermore National Laboratory Center for Applied Scientific Computing subcontract B571234, PI D. Quinlan; "Leveraging OpenAnalysis for Alias Analysis within ROSE", PI S.A. McKee, $40,000, 2007.

- 10. NSF CNS Award 0708788, "CRI: IAD Keeping Pace with Growing Computing Needs: A Strategy for Enhancing Multi-Core Microprocessor Research and Education at Cornell University", co-PIs D. Albonesi, J.F. Martínez, S.A. McKee, $93,865, 2007.
- 11. NSF CCF Award 0702616, "Towards Designing Complex Systems: Exponential Design/Configuration/Parameter Space Exploration Tools That Are Efficient, Accurate, and Easily Usable", PI S.A. McKee, $300,000, 2007-2010.
- 12. Intel Academic Equipment Donations (components for a 64-bit Xeon cluster), $26,030, 2007.
- 13. Intel Academic Equipment Donations (six Dell laptops for undergraduate research "mobile lab"), PI S.A. McKee, 2006.
- 14. Intel Research Foundation Equipment Donation (120 dual-processor 64-bit x86 chips), PI S.A. McKee, 2006.
- 15. NSF CNS Award 0509406, "Collaborative SMA: Dynamic Program Phase Adaptation and Hardware Reconfiguration in Multiprocessor Systems", PI J.F. Martínez, Co-PI S.A. McKee, $350,000 total, $150,000 to PI McKee, 2005-2007.
- 16. Intel Research Foundation Equipment Donation, PI S.A. McKee, $74,374, 2004-2005.
- 17. DOE Lawrence Livermore National Laboratory Center for Applied Scientific Computing award, ASC, PI D. Dossa; "BlueGene/L: Studies in Scalability and Reconfigurability: Memory Performance", Subcontract PI S.A. McKee, $65,000, 2004-2005.
- 18. Intel Academic Equipment Donation, PI S.A. McKee, $67,413, 2004.
- 19. NSF ST-HEC Award 0444413, "Scalable, Interoperable Tools to Support Autonomic Optimization of High-End Applications", Main PI S.A. McKee, co-PIs A. Malony (University of Oregon) and G.S. Tyson (University of Florida) $750,000 (PI McKee amount $329,670), 2004-2007.
- 20. REU Supplement 0530488 to award NSF ST-HEC Award 0444413, PI S.A. McKee, $15,000, 2004.

- 21. NSF ITR/NGS Medium Award 0325536, "Toward Autonomous Computing: System-Wide Hardware/Software Monitoring and Adaptation", Main PI S.A. McKee, co-PI H.S. Lee (Georgia Institute of Technology), $830,000 (PI McKee amount $415,000), 2003-2008.
- 22. REU Supplement 0434682 to NSF ITR/NGS Medium Award 0325536, PI S.A. McKee, $12,000, 2004.
- 23. Cornell University, President's Council of Cornell Women Affinito-Stewart Junior Faculty Award, PI S.A. McKee, $9,500, 2003.
- 24. AAAS/NSF Women's International Science Cooperation Travel Grant, with Universitat Politècnica de Catalunya, PI S.A. McKee, $4,000, 2003.
- 25. Cornell University, Cornell Information Technology Innovation in Teaching Grant, PI S.A. McKee, 2003-2004.
- 26. Small Business Initiative for Research (SBIR) Award, PIs: SRC Computers, Inc., $15,000, Subcontract PI S.A. McKee, 2002.
- 27. DOE Lawrence Livermore National Laboratory Center for Applied Scientific Computing award LLNL LDRD 01-ERD-043, PI B.R. de Supinski; collaborator: A. Yoo; "Overcoming the Memory Wall for SMP-Based Systems". Subcontract PI S.A. McKee, $238,000, 2001.
- 28. Intel Foundation Equipment Donation, "The Impulse Memory Controller Project", PI S.A. McKee, co-PI J.B. Carter, $10,000, 2001.
- 29. NSF CCR CSA Award 0073532, "Understanding and Improving Memory System Performance", $184,998, PI S.A. McKee, 2000-2003.
- 30. REU Supplement 0211668 to NSF CCR CSA Award 0073532, PI S.A. McKee, $5,000, 2002.
- 31. CRA Distributed Mentor Program, support for three interns, summers 1999, 2000.
- 32. NSF POWRE Award 9806043, "Understanding and Improving Memory System Performance", PI S.A. McKee, $75,000, 1998-2000.

What Is the Problem?

- Be concise
- Explain for a very general audience

Why Is it Important?

- Tell the readers why they should care
- Be concise
- Be specific
- Tie the solution back to impact
  - On your field
  - On science, in general
  - On society (Sweden first, then Europe, then global)

What's the Shape of a Solution?

- Outline your general approach
- Avoid unnecessary detail
- Explain for a very general audience
  - as much as possible
  - include references w/ more details

Why Will It Work?

- Be concise!
- Point to prior results
  - yours
  - other people's
- Include preliminary results
  - don't sound like you've already solved everything
  - be clear about what remains to be done
- Say why you are the one to solve the problem

How Will You Show That It Works?

- Have a clear plan
  - need details on how you will start (e.g., at least one year)
  - need fewer details for how you will proceed (maybe)
- Explain the technical agenda
  - be concise
  - need not be (just) for a general audience (but don't be too arcane)
- Identify team
  - co-PIs?
  - grad students and/or postdocs
  - collaborators (internal and external)
- Identify resources
- Include a timeline

Common Mistakes

- Simon Peyton Jones slides . . .

VR Formula (1)

- Purpose and Aims
  - What's the problem?
  - Why is it important?
  - What's the shape of a solution?
- Survey of the Field
  - Why will it work? (part A)
  - Include your own work (as appropriate)
  - Include other's prior results
  - Include seminal as well as recent work

VR Formula (2)

- Project Description (details go HERE!)
  - More on "Why will it work?"
  - How will you show that it works?
  - Subsections help you GUIDE your reader
    - More detailed background
    - More detailed explanation of approach
    - Maybe details of preliminary results?
    - Experimental agenda (including timeline?)
    - More detailed description of (extended) team (if it strengthens your case)

VR Formula (3)

- Any sections you decide to add go here
- Part of Project Requested
- Budget Justification

Writing Advice

- Be nice to your reader!
- Be concise
- Be precise
- Shorter sentences are easier to read (and harder to screw up!)
- Clear figures help a lot
  - avoid clutter/"chart junk" (see Tufte)
  - put tables into figures (smaller [sans serif] font -- less space)
- Don't oversell (let your facts speak for themselves)
  - Choose precise verbs
  - Avoid adverbs (e.g., "very", "significantly")
- Avoid noun forms (e.g., "*tion", "*ing")
- Avoid passive voice (say WHO does WHAT, not what "is done")

Selling It (Making Your Points)

- Places of emphasis
  - first (in a section, in a paragraph)
  - last (and last BEATS first wrt impact)
- Write a draft w/o worrying about finesse
  - then cut-and-paste (move details back)
  - scrutinize every
    - paragraph
    - sentence
    - word (is it necessary? if not, omit)

Budget

- Don't obsess over details
- Let the Econ people do this for you

CV

- Detail counts!
- Spin, spin, spin

ESL Pet Peeves

- Spellcheck!
- Avoid the infinitive (no "this allows to optimize …")
- Avoid breezy colloquialisms (no "Nowadays, …")
- Avoid contractions
- AVOID PASSIVE VOICE
- Check for subject/verb agreement in number
- Check the articles
- Check for extraneous commas (you don't insert one whenever you take a breath!)

Revise, revise, revise

- Make sure the references are correct and scholarly
- And then submit ☺

What I Do as a Reviewer

- Read the abstract
- Read the references (!)
- Look at the figures