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Mentoring, cross-disciplinary links and the Antikythera Mechanism

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CASS
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Innovation and Discovery in Radio Astronomy
13-17th September 2016, Queenstown, NZ



Mentoring Ron's way *(Tasso's experience)*

Challenging!

- The most challenging job interview!!
 - At the most vulnerable?
 - Direct challenge on own work.
- Testing strengths
 - Conviction
 - Courage
 - Fortitude
 - Standing up for beliefs
 - Challenging back

→ Fearless advice

Trust & Responsibility

- Entrust with tasks
 - Size not important but accepting responsibility is
 - Organising colloquia
 - Selecting the LBA recorder (S2)
 - Assistant “to the” Director
 - Working on the 1995 decadal plan (Excel)
- Reporting back
 - “You decide if I need to know” – no micro-managing
 - “If you get it wrong you accept the responsibility”
- Accept responsibility & criticism
 - K-band VLBI public criticism
 - (“Bollocking”?)

Empowering & Challenging

- Challenge with substantial tasks
 - URSI Commission J – Editor of contributions every 3-years (did 9 years)
 - URSI representative on IUCAF – replace Brian Robinson
 - Still doing it... (> 20 years)
 - ITU-R WP7D – replace John Whiteoak
 - More than 15 years; last 5 as chair....
 - IAU – Working group on RFI mitigation (9 years)
- Most of my international involvement traced directly to Ron!!
- VLBI Operations and Development
 - Setting up of APT (Ron and Ye)
 - Took over operations when JER went to Parkes
 - Still staying involved – international links

RDE-style successes

- Establishment of RAFCAP
 - 2001 APRASC (regional URSI) meeting
 - Made proposal (with M. Ohishi) and got meeting to approve
 - Got it approved
 - Registered it in the region
 - Still carrying it
 - Very much a direct action - just like Ron
- VDIF adoption by VLBI community
 - Committee done excellent job developing
 - I had no authority – but took the floor and push for adoption & succeeded
- Best compliment received!!
 - Particularly assertive in meeting (ATNF webpages)
 - I was counseled afterwards – “Too much adoption of Ron’s style”

Still mentoring us!

- Most trusted advisor in ATNF
 - Students
 - Post-docs
 - Senior staff
- My current position (Engineering management)
 - Ron's suggestion to me
 - Ron's suggestion to the management
- Privileged to have the office opposite him!
 - Last 2 offices in the “difficult persons” wing....
 - Right next to the stairs and the exit!!

Innovation & Cross-disciplinary links

The Antikythera mechanism

Innovation

- Ron extremely strong on innovation
 - See Ron's talk Fri 10:45 "Innovations and Discoveries"
 - Links via Derek de Solla Price
 - theory on the exponential growth of science (1960)
 - Great paper in 1974 "*Gears from the Greeks*"
 - "The Antikythera mechanism"
 - Ancient mechanical astronomical computer
- Ron introduced me to the mechanism (and I'm Greek!)
- Suggested as topic for a workshop in my village (Kerastari)
- → Workshop, 12-15 June 2012

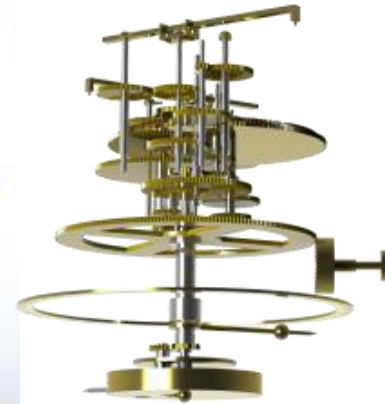
The Antikythera mechanism - fragments



- 82 surviving fragments
- A B & C shown
- PTM enhanced

From Tony Freeth talk.

Antikythera mechanism reconstructions



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The Aristotle University of Thessaloniki bronze model

Deciphering the Antikythera mechanism

A cross-disciplinary adventure

- X-ray tomography (CT)
 - Had to develop instrument with x 2 X-ray intensity
 - New technology. Now in wide use
 - Had to bring the X-ray machine to the museum
 - Dis-assemble and re-assemble!
 - Deciphered gearing
 - Technology related to radio **interferometry**
- HP's "Polynomial Texture Mapping" (PTM)
 - Related to **photogrammetry**
 - Spectacular image enhancements
 - Enabled reading many inscriptions
- Huge steps in deciphering mechanism and reconstructing
 - An ongoing process
- New expedition to wreck site in 2015
 - More fragments?

From Antikythera to the SKA: Lessons from the Ancients

Rationale

- Explore the evolution of astrometry and computing from ancient Greece to the present,
- Compare the technologies used to unravel the secrets of the Antikythera Mechanism with the imaging tools of modern astronomy,
- As we pursue our vision of an exciting scientific future with telescopes such as the SKA, reflect on
 - why the Antikythera technology was lost for more than a thousand years?
 - could this happen again?
- Excellent participation from archaeologists and astronomers
 - A true cross-disciplinary workshop

Workshop references

- 2012 workshop website and links therein:
 - <http://www.atnf.csiro.au/people/Tasso.Tzioumis/Antikythera2012/index.html>
- Workshop Proceedings online in PoS
 - <http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=170>

And links therein e.g.

http://pos.sissa.it/archive/conferences/170/018/Antikythera%20&%20SKA_018.pdf for a description of the Antikythera mechanism.

http://pos.sissa.it/archive/conferences/170/050/Antikythera%20&%20SKA_050.pdf for a copy of Tingay's summary in "The conversation"

http://pos.sissa.it/archive/conferences/170/014/Antikythera%20&%20SKA_014.pdf for Ron's talk on History of innovation

etc...

**** Have fun exploring the links!!!**

Sequel?

The next Kerastari workshop

29 May – 4 June 2017

<http://www.atnf.csiro.au/people/Tasso.Tzioumis/Labyrinth2017/index.html>

(Website under construction: active from October 2016)

The labyrinth of the unexpected:

unforeseen treasures in impossible regions of phase space

- Explore how radio astronomy has enabled flexible signal processing environments that are opening new windows on the Universe (discovery of FRBs is the prime example) and may open others (e.g. SETI).
- How have recent unexpected discoveries unfolded in a technical sense and in the new/traditional fora for scientific debate?
- Has anything benefited the process or held it back?
- As we enter the era of the SKA, are we prepared for the technical challenges and, more importantly, do we have people prepared for serendipity?
- Or are we preparing a generation of SKA users to blindly extract data from catalogues to produce plots?
- Do these questions matter?

Themes

- Discovery process - main theme
- Fast Radio Bursts (FRBs) - discovery; controversies; interpretation
- Search for ExtraTerrestrial Intelligence (SETI) - searches; BreakthroughListen; life in the universe;
- Radio Frequency Interference (RFI) - RFI and its impact on discoveries;
- Propagation effects - radio sources as probes of the ISM/IGM;
- Instruments - new telescopes and techniques; role of large-scale computing and data mining;
- Multi-wavelength, multi-messenger (gravity waves, neutrinos etc) exploration;
- How can we maximise the success of serendipity for the SKA?

Invitation to Kerastari workshop

- **Open workshop – ALL welcome**
 - Venue limitations → < ~80 people (previous 50-60)
- Group from RonFest here – ideal participants
 - All influenced by Ron's love for innovation and discovery
 - Quite a few have already been to previous workshops
- Details in a few weeks
 - But format similar to previous workshops – details already on web
 - <http://www.atnf.csiro.au/people/John.Reynolds/Kerastari2012/index.html>
 - JER's photos from the previous workshop
 - 1st announcement – copies to this group?

**** Personal invitation from me to ALL participants in RonFest.**

Thank you

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