



John Innes Centre

*Unlocking Nature's Diversity*

## RSEE 2026 Theme

*"Research Software in the Era of AI: Best Practices for HPC, Security, and Managing Technical Debt."*

# Introducing RSEs to the JIC

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# Quick introduction

- BSc Computer Science
- MSc Remote Sensing
- PhD Solar System Physics

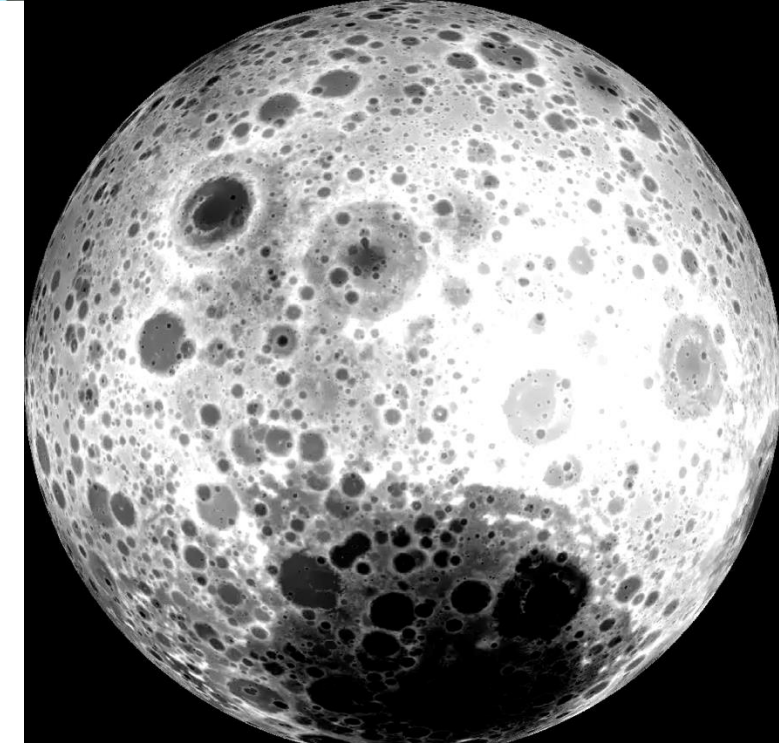
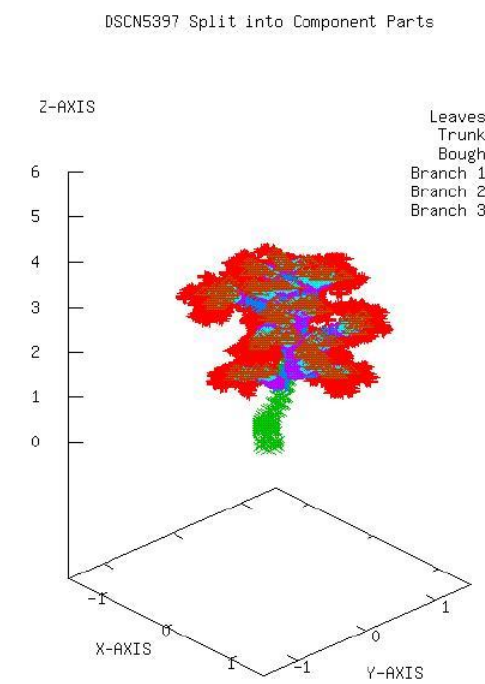
*NASA/ESA project using ML to classify lunar craters*

- Data Manager for IBERS

*Lone departmental SysAdmin, building and managing HPC, storage and local cloud + services*

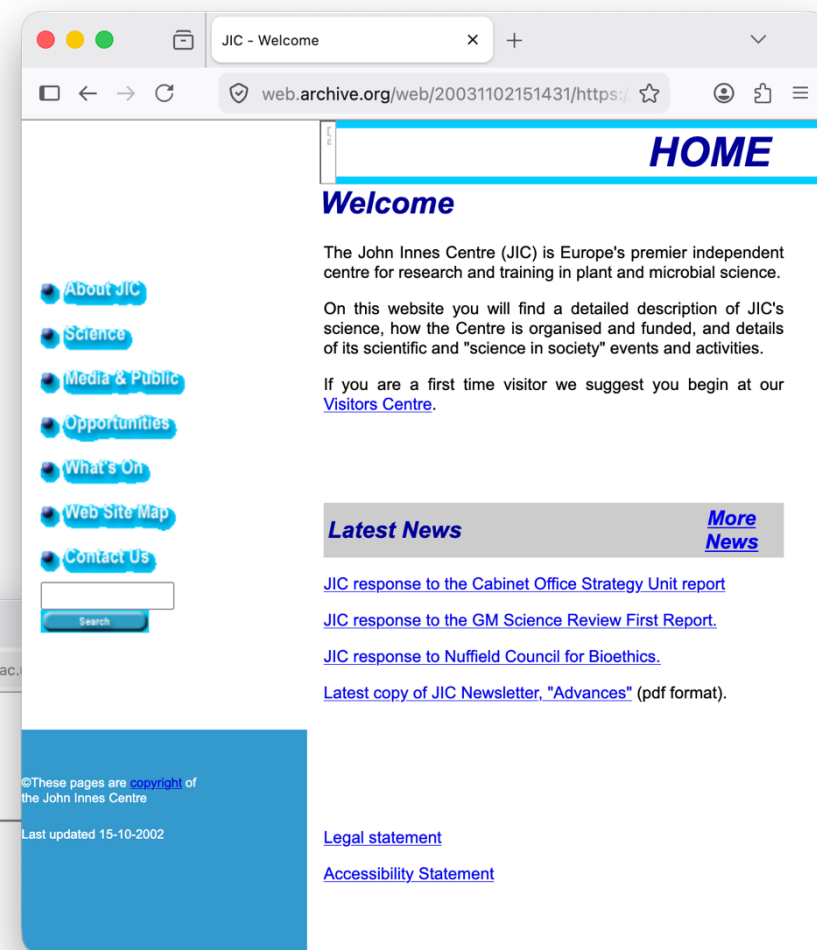
- JIC Bioinformatician

*Initially postdoc in an epigenetics group, now senior scientist in the informatics group*



# The Informatics group

- Informatics grew organically
- Driven by immediate research needs
- Bioinformatics the priority
- Ad-hoc web services
- Little central coordination
- Variety of tech stacks
  - The flavor of the month



# What Worked (At First)

- Close alignment with researchers
- High flexibility and responsiveness
- Impact
- Enthusiasm of PhD and Postdocs producing new tools



ORDER  
Oilseed Rape Developmental Expression Resource



The tragic ripples of an epic fraud p. 636 | Insect pest profits from maize defenses pp. 642 & 694 | Photoredox activation of methane pp. 647 & 608

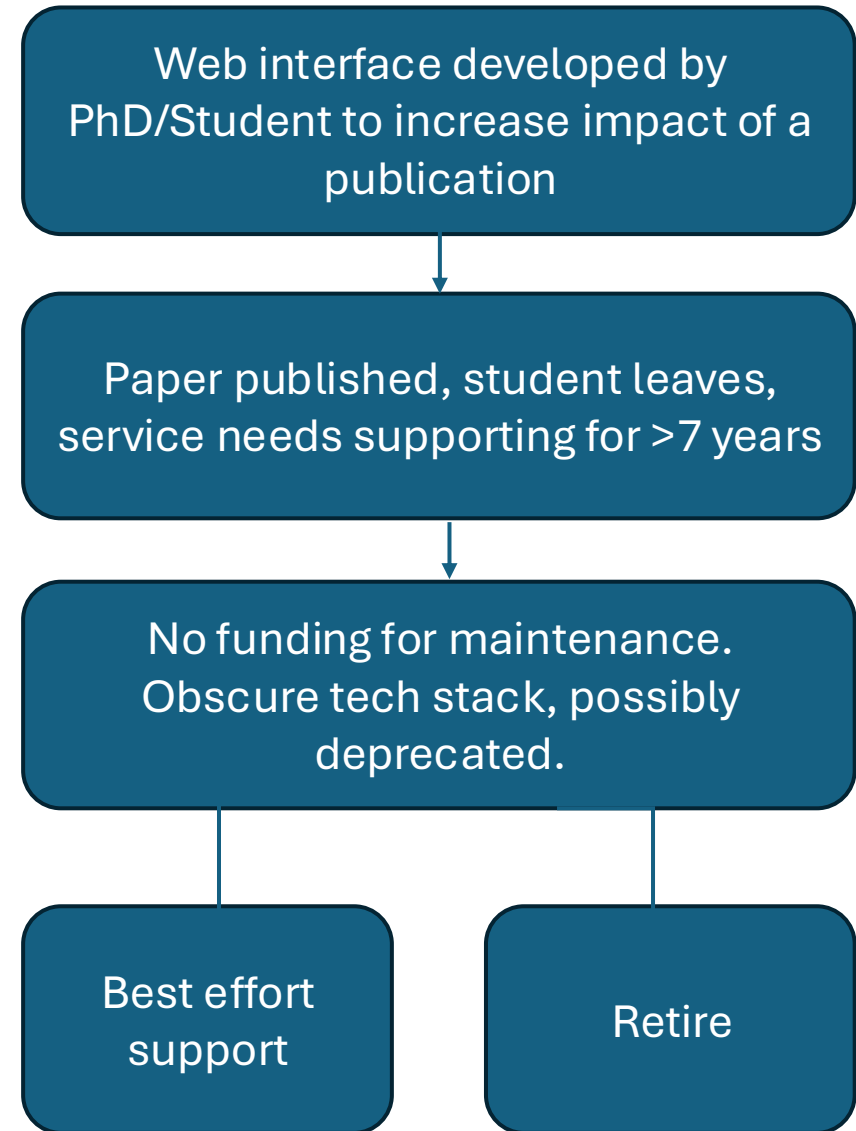
Science \$15 17 AUGUST 2018 sciencemag.org AAAS



ROAD MAP FOR  
**WHEAT**  
Ordered sequence will speed research pp. 635, 661, & 662

# The Hidden Cost

- This becomes our responsibility
- Short term project funding cycles
- Systems rarely revisited after delivery
- Accumulating technical debt
- Ageing dependencies and fragile systems
- Unclear ownership, especially after someone leaves



# The Consequences



- Increasing maintenance burden
- Slower innovation over time
- Risk to reliability and security
- Knowledge silos
- Begins affecting our core bioinformatics project work
- I actively pushed back against introducing any new web services
- Retired services and reverted to static html

# Intervention: Introducing RSEs

- Deliberate shift over ~4 years
- Establish Research Software Engineers (RSEs) at the JIC
- Separate from bioinformatics roles
- Define service ownership
- Reduce and prioritise technical debt
- Simplify and standardise practices



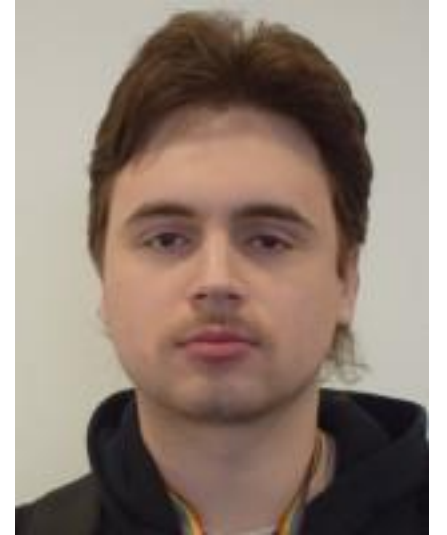
RSE

# Where We Are Now

- Small, focused RSE team (2 people)
- More maintainable service landscape
- Clear ownership and accountability
- Shift from reactive → proactive
- More time for innovation
- We are now introducing new webservices



Miguel Gonzalez Sanchez



William Redding



*Rob Ellis – Now UEA MSc*

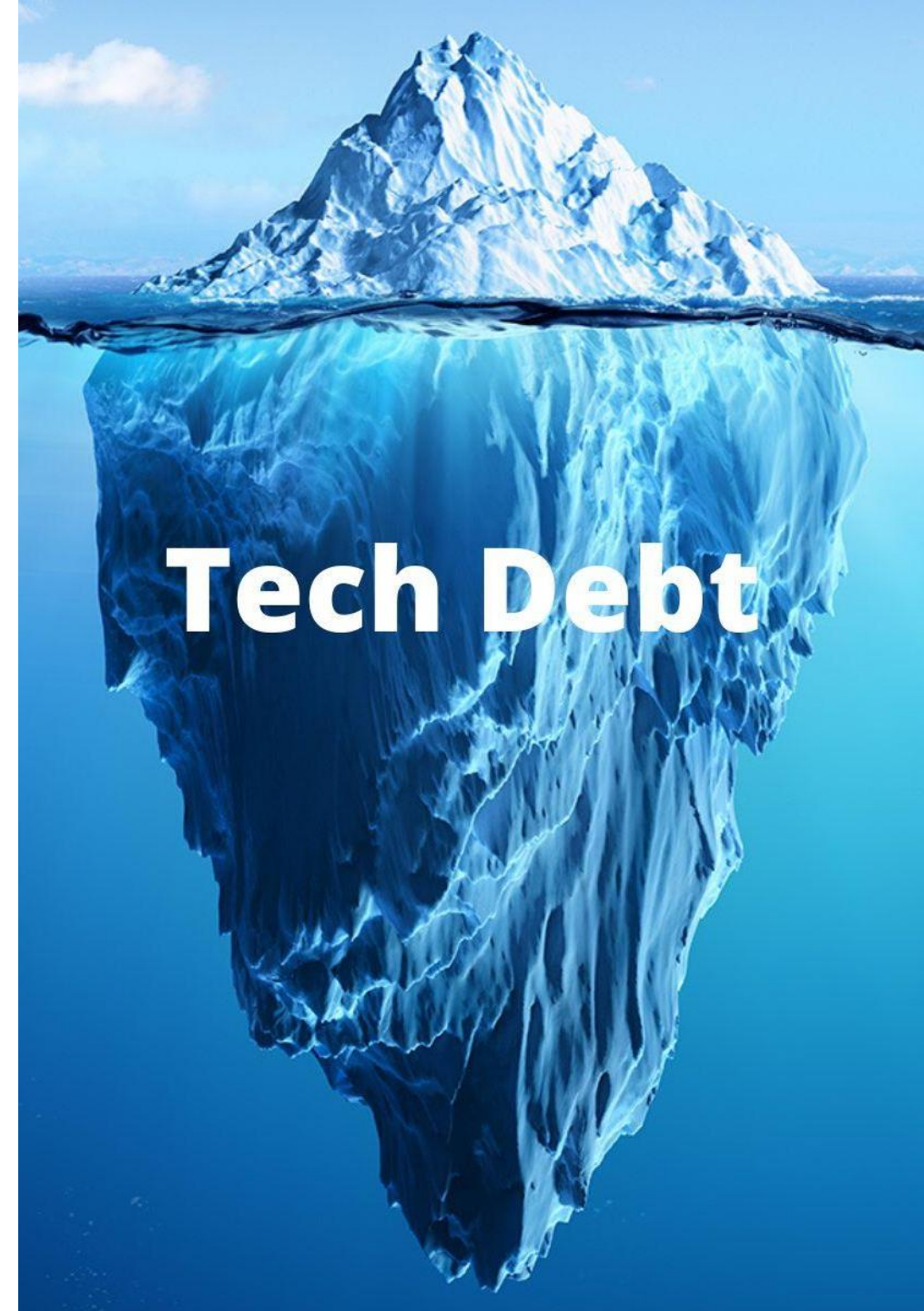
# Enter AI



- AI drastically lowers development barriers
- Prototypes → production in days
- Explosion of tools and services
- “Zero-cost” perception of development
- Now takes longer to deploy a service than it does to create it

# The (not so) New Risks

- Rapid accumulation of technical debt
- Security vulnerabilities
- Unclear governance and ownership
- Over work
- Fragile dependencies (APIs, SaaS, the costs)
- If an AI created it, can only an AI really fix it?
- Institutional and reputational risk

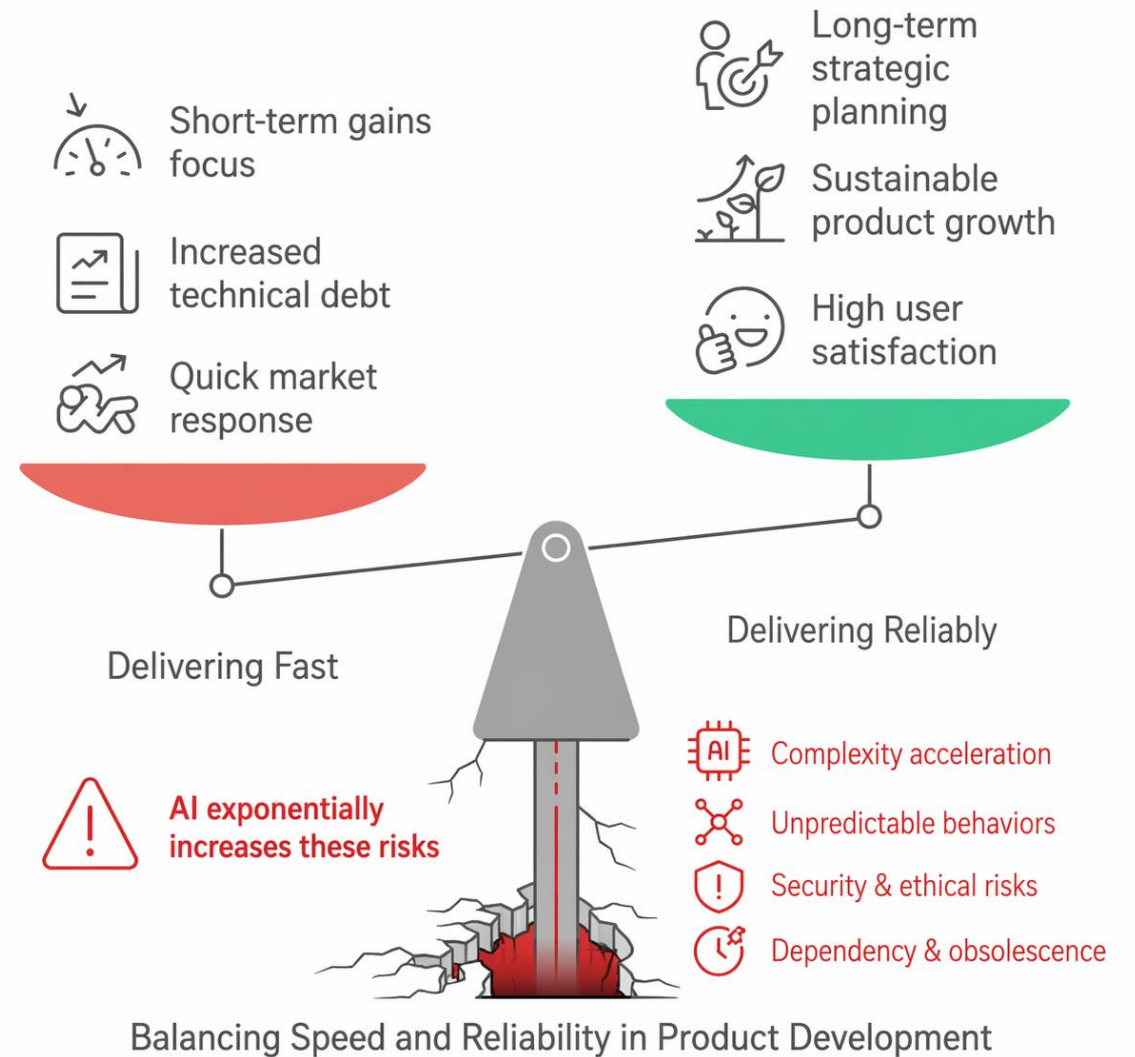


# Practical Lessons / Best Practices

- Treat prototypes as *temporary by default*
- Define ownership early
- Budget for maintenance, not just development
- Apply security considerations from the start, more tightly coupled with core computing
- Regularly review and retire services
- Teach prospective web service devs to work with us as we need to support their creation when they leave
- Have a fallback to a static site to meet the minimum requirements of any publication

# Key Takeaway

- AI accelerates development, not sustainability
- RSEs deliver essential software engineering
- We are being defensive about the projects we take on
- This is not just technical:
  - Scientific integrity
  - Operational stability
  - Institutional risk management





RSE

Technician **Commitment**

*If you've not already, come talk to me in the break, talk to me about drones, image processing, nitrate sensors.*

# Thank you

From reactive to sustainable  
RSEs as enablers, not overhead  
In the AI era, discipline matters more, not less

## Acknowledgements

### RSEEE & WHPC

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NBI Research Computing

Core Computing Team

### JIC Informatics Platform

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Miguel Gonzalez Sanchez

William Redding

Rob Ellis

**All our collaborators at the JIC and beyond**



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