

# Case Study: Addressing the Gender Gap in Computer Science

## 2013 - 2021

School of Computer Science @ Technological University  
Dublin

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Head of Data Science and AI



# Technological University Dublin



**Ireland's 2<sup>nd</sup> largest third level  
Educational institution**

**29,000 students**



# School of Computer Science @ TU Dublin

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1000 undergraduate students

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300 postgraduate students

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60 PhD students

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44 academic staff

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20+% UG female students



# 2 Areas of gender balance focus

Runner-Up  
Minerva  
Equality Award



“Encouraging female students to enrol in Computer Science programmes and retaining them”

**Students**

Winner  
Minerva  
Equality Award



“Developing the careers of female faculty”

**Staff**

# Part 1 - Student Initiatives

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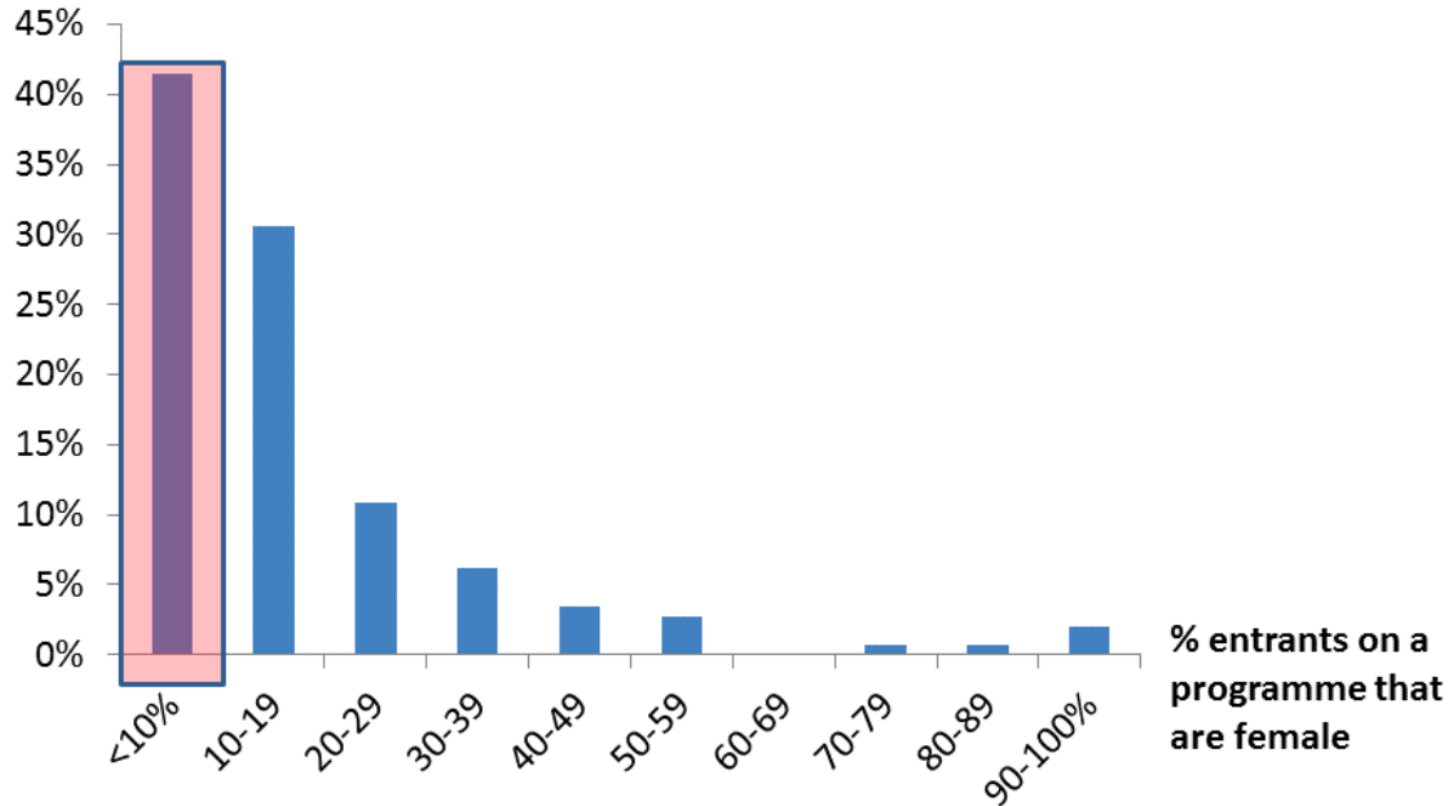
“Developing the careers of female faculty”

**Staff**

# Comp Sci gender balance – Ireland 2013

Over 40% of computing programmes in Ireland had < 10% female new entrants year (2014-15)

% of computing programmes



# 2013 – our School of Computer Science

**First year intake of females @ 10%** in our  
Comp Sci undergrads

Typical of national picture

A determination to **change**

**2013**

**10%**

# by 2021 – our School of Computer Science

Big increase in uptake of Comp Sci  
(including a new programme @ 42%)

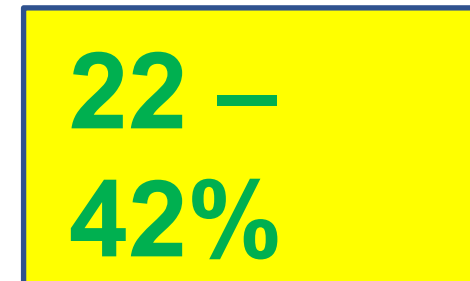
A change in ethos

CS Gender balance awareness

**2013**



**2021**





# Our approach

## Undertook initiatives in:

- **Communication**
- **New Programmes**
- **National co-operation**
- **Mentoring**

**2013**

**10%**

**2021**

**22 –  
42%**



# Step 1 – Talked to our current students

Pizza lunch with our female students

Why did you pick Comp sci?

How is it going?

How do we get more females in ?



# How's it going?

“It was one of my first labs. I stood at the door . There was already a big group of lads in there - making alot of noise – generally rowdy – no other girl around. The lab assistant was sitting in the corner not paying any attention. **I really wanted to turn around and run.** I nearly did. But I went in and just sat quietly – too mortified to ask anyone how to get started. “

# A variety of experiences

“ I never knew it was so creative. Noone knows that. I just found out by accident at a coding event in school – which I nearly didn’t go to anyway!”

“I have no-one to be friendly with in my class

“I really want other females to know that they are able to do the course because it teaches you how to **think** and be inventive. I hope other young girls won’t have to go through the same thing that happened to me”  
(She studied dental nursing first)

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“I love it. It’s so creative”

“I can sum it up in one word why girls don’t pick Comp Sci: Maths. Everyone thinks it’s all about maths”.

# Immediate Actions

- Every lab group with female students in it must have at least two females (easy!)
- Regular meet ups for students (easy-ish)
- Examine what CS programmes ARE popular with females

# Next Step: What CS programmes are attracting the most females ?

- We examined intakes into first year on all computer courses in Ireland for 2014, 2015 (& 2020)
- Data from the national education authority (no longer available GDPR)
- Data via our Ingenic network (more later)

# CS programmes attracting the most females across Ireland

BA Psychology & Computing	53%
BSc Comp Sci international (language) *	42%
BSc Creative Media and Interactive Design	35%
BA Digital Humanities & IT	35%
BSc in Computing & Digital Media	33%
BSc Management Science & Information Systems	32%
BA Digital skills	"High" - no figures

Patterns ?





# Next Step: What CS programmes are attracting the most females ?

## Finding

- Programmes with higher female intakes are not “Computer Science” on its own
- Popular computing programmes have **applied** or **complementary** skills (e.g Computer Science with a language, business computing, IT management, Green IT, digital media\*)
- We term these hybrid programmes

## Action: New Programme

- We established our own **hybrid** programme: Computer Science (International) - 2017
- Includes learning a foreign language
- Consistently higher proportion of females (2021 reached **42%** female (double our other Comp Sci))
- High impact strategy

## Action: New Programme 2

We launched FREE coding courses for non tech female students in our institute (2016)

Linked to not for profit CodeFirstGirls

<https://codefirstgirls.com/courses/>

Minimal effort, zero cost, volunteers staff

> 250 girls so far

← Tweet



TU Dublin Computer Science  
@tudublincompsci

Opportunity for our female and non-binary students to #LevelUp this summer by taking an 8 week #CodeFirstGirls front-end Web Dev course for #FREE . Supported by @HubSpot  
More Details: 📌

## Next: What are other CS Schools doing ?

- Every School of Computing in Ireland working on the female pipeline problem
- Why not share ideas?
- ***In 2017, we contacted all 18 universities in Ireland***
- **Now: A network of every School of Comp Science in Ireland**



# Irish Network For Gender Equality In Computing

<http://ingenic.ie/>

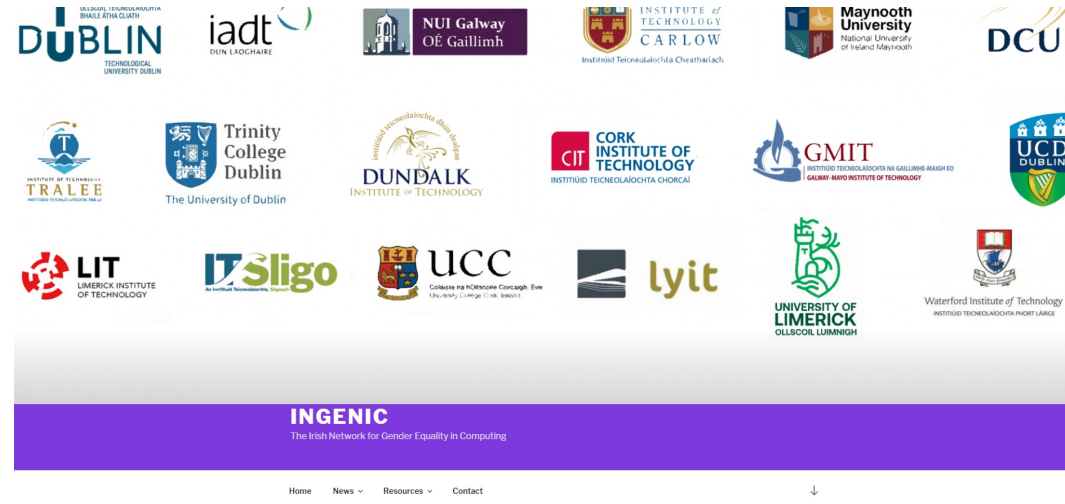
**Ingenic enables:**

Share best practices

Vehicle for FUNDING

Large pool for data/ surveys

Fantastic networking



# Example of funded project via INGENIC

## TECHMATE

Best Practice Toolkit for  
Gender Equality in Computer  
Science Education

Comprehensive review of literature  
for initiatives with impact

<https://arxiv.org/pdf/2206.06113>

Development of an online toolkit to  
encourage use of these initiatives

Project funded by Irish government  
& Huawei

# Mentoring –ESTeEM Initiative\*

- Female students across Comp Sci and Engineering offered an industry mentor
- Monthly lunches @ TU Dublin with industry/ alumni/ mentors
- Support, advice, networking, confidence
- Vision , motivation, execution: Leslie Shoemaker



\* Esteem was set up by Leslie Shoemaker

# Others smaller initiatives

- Week long CS summer school (gender balanced)
- Senior school (ages 15-16) workshops @ TU Dublin (female)
- School visits



# Management support & Culture

- Constant support from Management
- Gender issue in our School's strategic priorities
- A female head of school for 10+ years!
- A national policy of change: e.g. Research funding gender rules
- An environment genuinely interested in change

# Part 2 - Staff Initiatives

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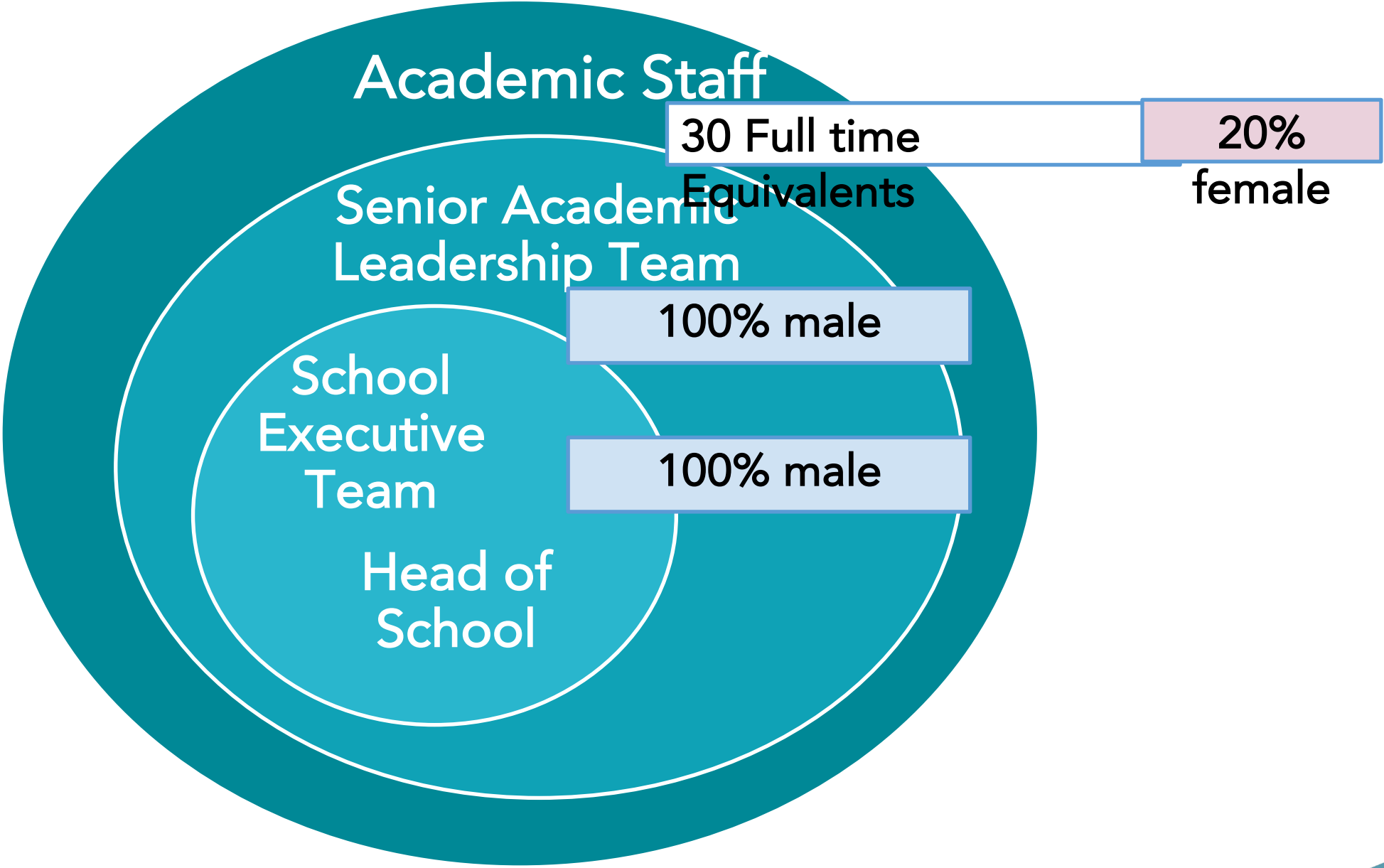
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# Pre 2012 STAFF profile in our School



# Up to 2012 - what we found

- Academic posts - **lack** of female applicants
- Lack of progression of females to management or professor grades (0-25%)
- Heavy loads of **administration & management-style** roles taken on by females
- Difficulty in returning after **maternity leave** : teaching loads and gaps in research output;
- Legacy networks and culture of academic institutions created and populated by males

# Our 4 aspects to staff gender balance



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Career

Environ  
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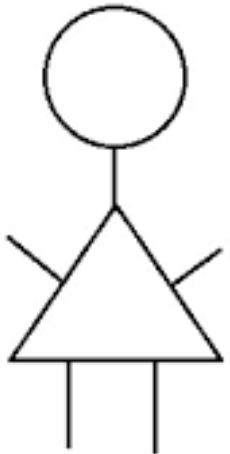
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# SUCCESS - SOURCE



- Simple focus - gender balance in our recruitment
- **When a job vacancy arose**, informally identified female candidates external to our university/School and encourage them to join our team, using our networks to attract and target suitable female staff.



# SUCCESS - CAREER



Career

Boost skills, career strategy, ambition and confidence

- Aurora leadership programme for female staff
- Annual performance review for **all staff**
- Research supports (and min % of females as national funding rule)
- Mentoring scheme (both across uni, and within School)

# SUCCESS - ENVIRONMENT

Gender Equality has been a genuine heartfelt aim :

- In our university –  
WLHE (Women Leaders in Higher Education)
- **Athena Swan** - national badge scheme for gender balance (funding condition!)
- In our sector – We set up national network of Computer Science nationally - **Ingenics (as mentioned already)**





# SUCCESS - SUPPORT



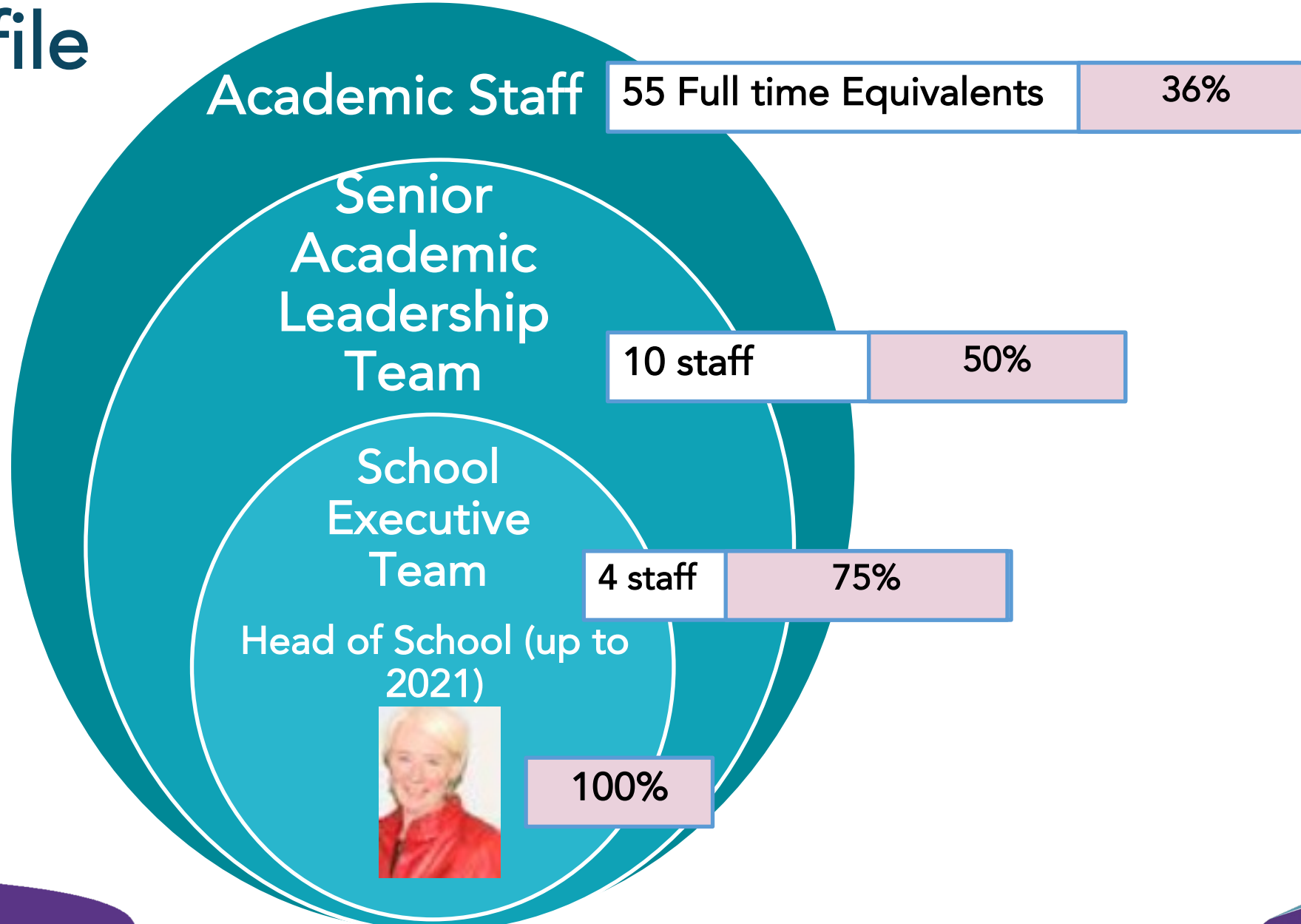
Support

It's the simple things to make life easier for staff with personal commitments

- "Minding the modules" while on leave
- Flexible work allocation
- Considerate timetabling



# By 2019 School staff - gender profile



# Take home points I want to highlight

- **Hybrid programmes** are high impact for student numbers
- A **sense of belonging** for students is key
- Simple supports for **female staff** really help
- We can't be **complacent!** Constant change
- So much time is **voluntary** in this – Put money behind it!
- Gender balance drive must come from the top – and really felt

. Thank you