

# Addressing Skills Shortage and Gap Through Higher Education

**Dr Jason R.C. Nurse**

Associate Professor in Cybersecurity, School of Computing, University of Kent

Visiting Academic in Cybersecurity, University of Oxford

Visiting Fellow in Defence & Security, Cranfield University



[j.r.c.nurse@kent.ac.uk](mailto:j.r.c.nurse@kent.ac.uk)



[jasonrcnurse](https://www.linkedin.com/in/jasonrcnurse)



[jasonnurse](https://twitter.com/jasonnurse)



# ADDRESSING THE EU CYBERSECURITY SKILLS SHORTAGE AND GAP THROUGH HIGHER EDUCATION

NOVEMBER 2021

## **AUTHORS**

Jason R.C. Nurse (University of Kent), Konstantinos

Adamos (University of Aegean), Athanasios

Grammatopoulos (ENISA),

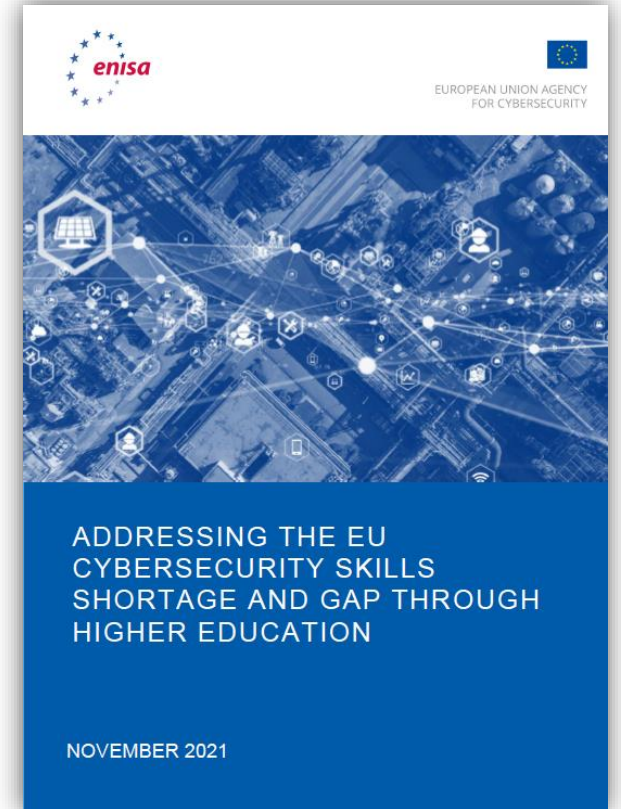
Fabio Di Franco (ENISA)

# Introduction to the report

The report provides **an overview of the current supply of advanced cybersecurity skills in Europe** through an analysis of the recently established Cybersecurity Higher Education Database (CyberHEAD).

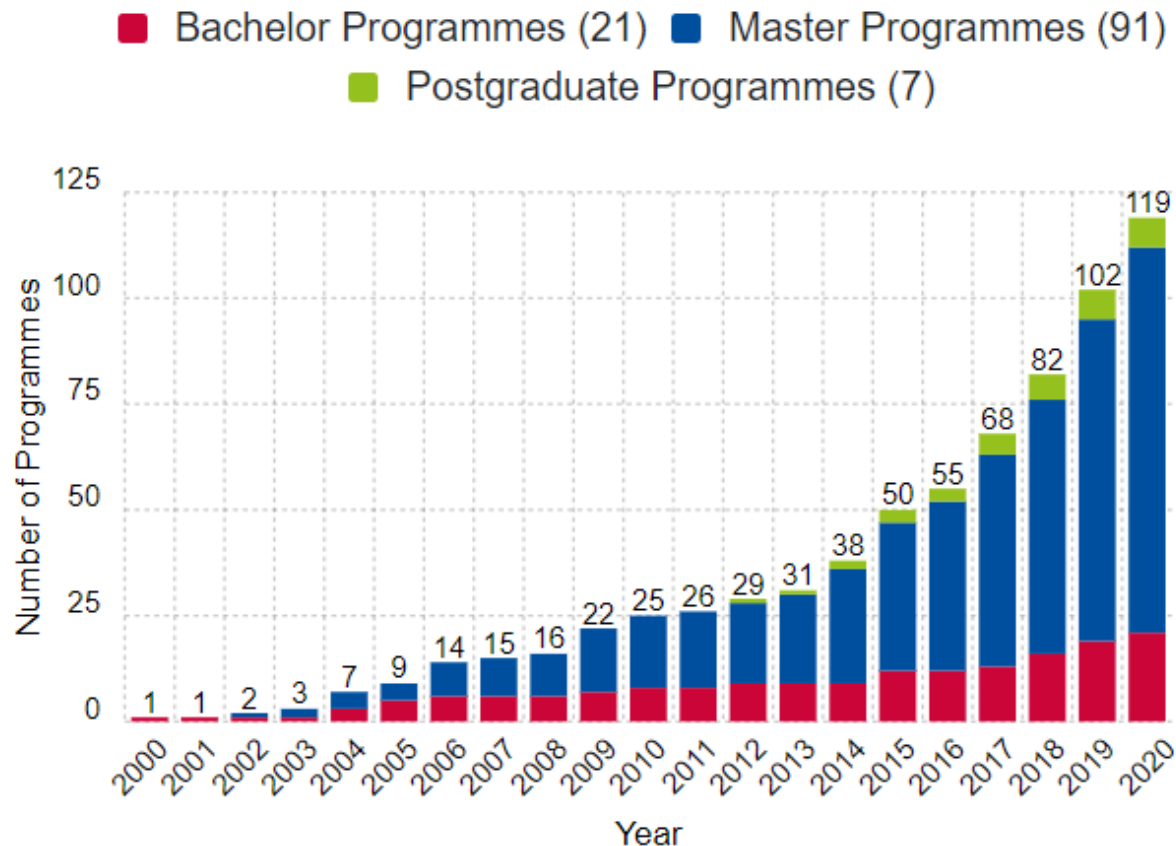
The report **describes the policy approaches adopted by EU Member States in their quest to increase and sustain their national cybersecurity workforce.**

The report proposes **a series of recommendations for reducing the cybersecurity skills shortage and gap through Higher Education in the EU.**



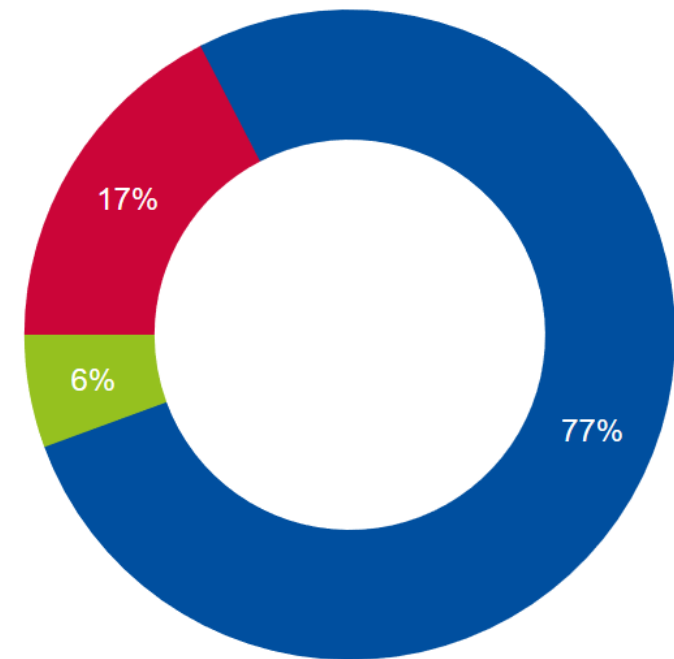
# Increase in Programmes each year, with Masters Programmes the most popular

## Total programmes per year



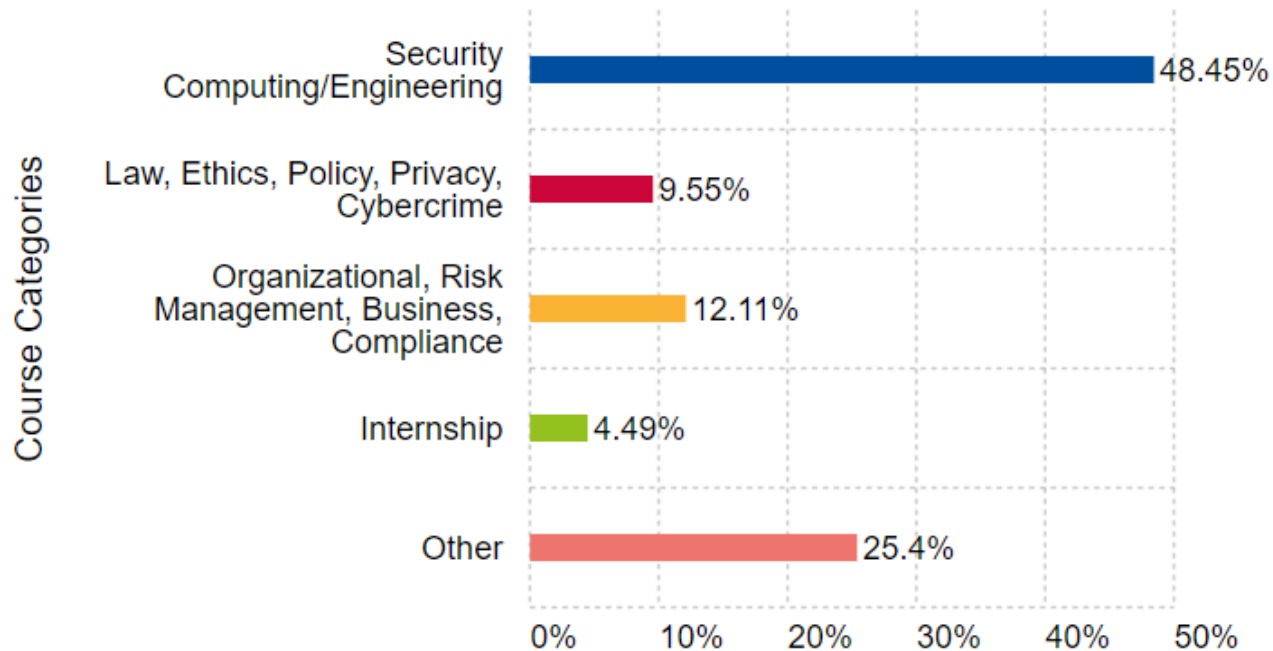
## Programme types

■ Bachelor (22) ■ Master (97) ■ Postgraduate (7)



# Programmes match Skills required, but more Diversity needed in Programme Topics

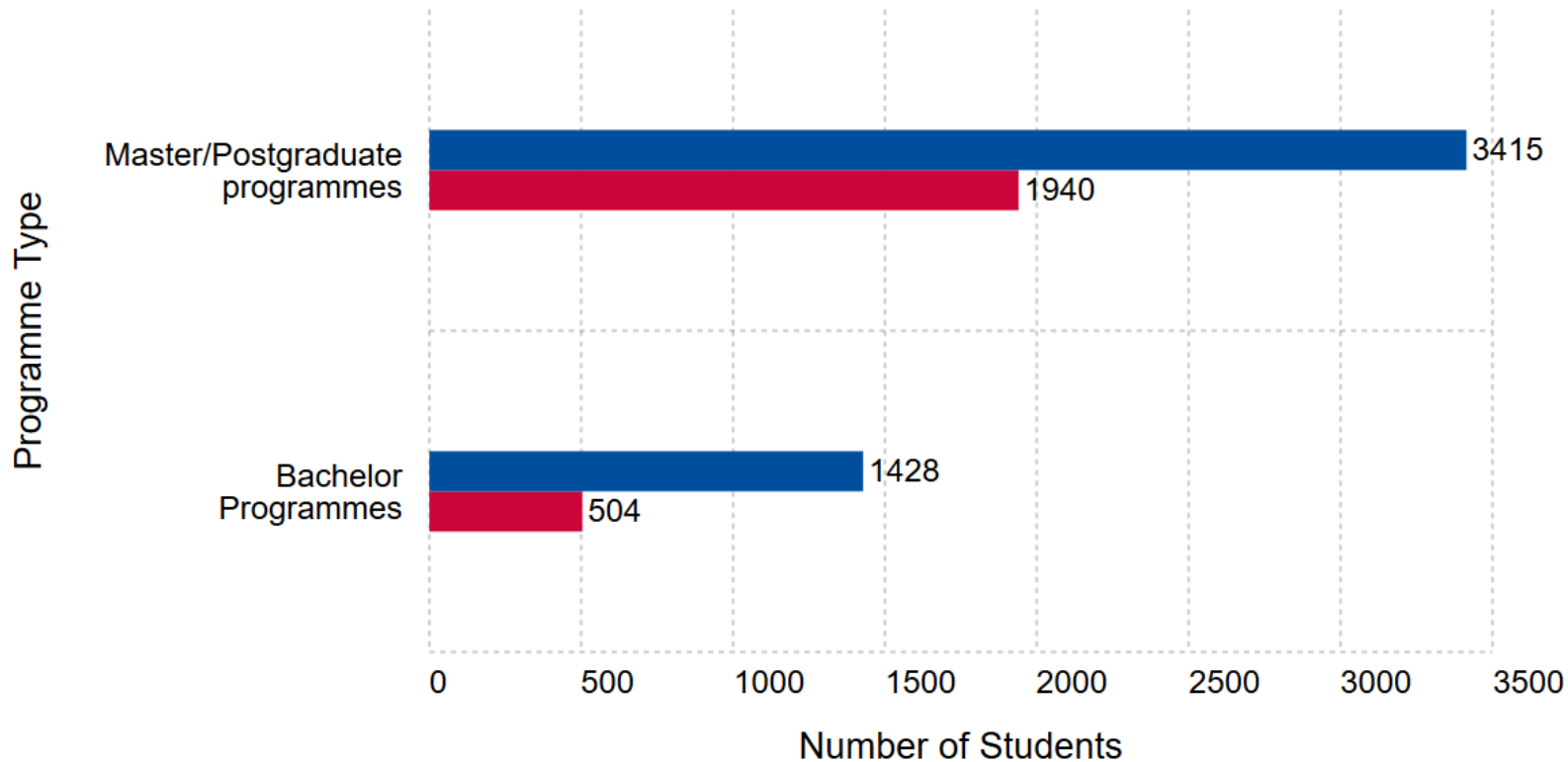
All Bachelor and Master/Postgraduate programmes average ECTS allocation



- The focus on Security Computing/Engineering matches the greatest areas of shortage of cybersecurity skills (e.g., application security, cloud computing security, security analysis and investigations)
- An underrepresentation in Law, Privacy, Compliance suggests a need for more diversity in programmes – this is also supported by skills requested in industry.

# Graduate numbers to double in the next 2-3 years

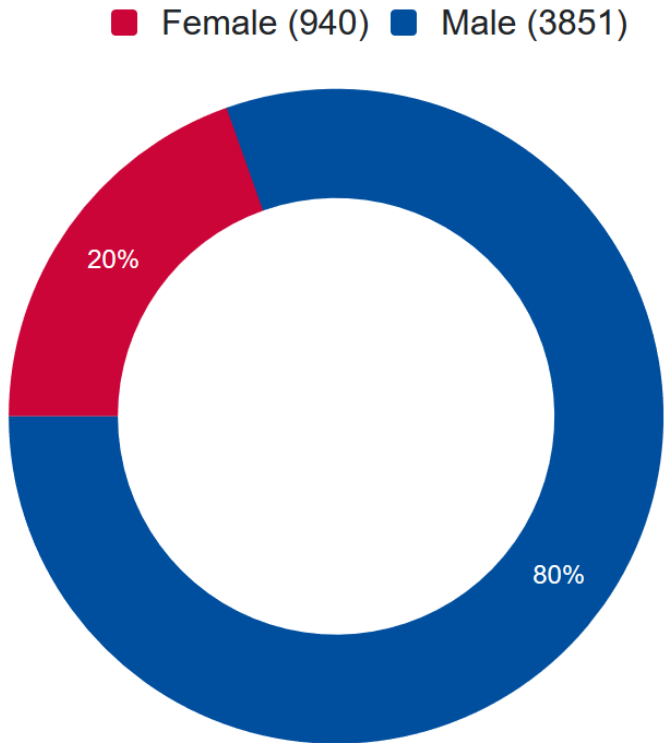
■ Students Graduated ■ New Students Enrolled



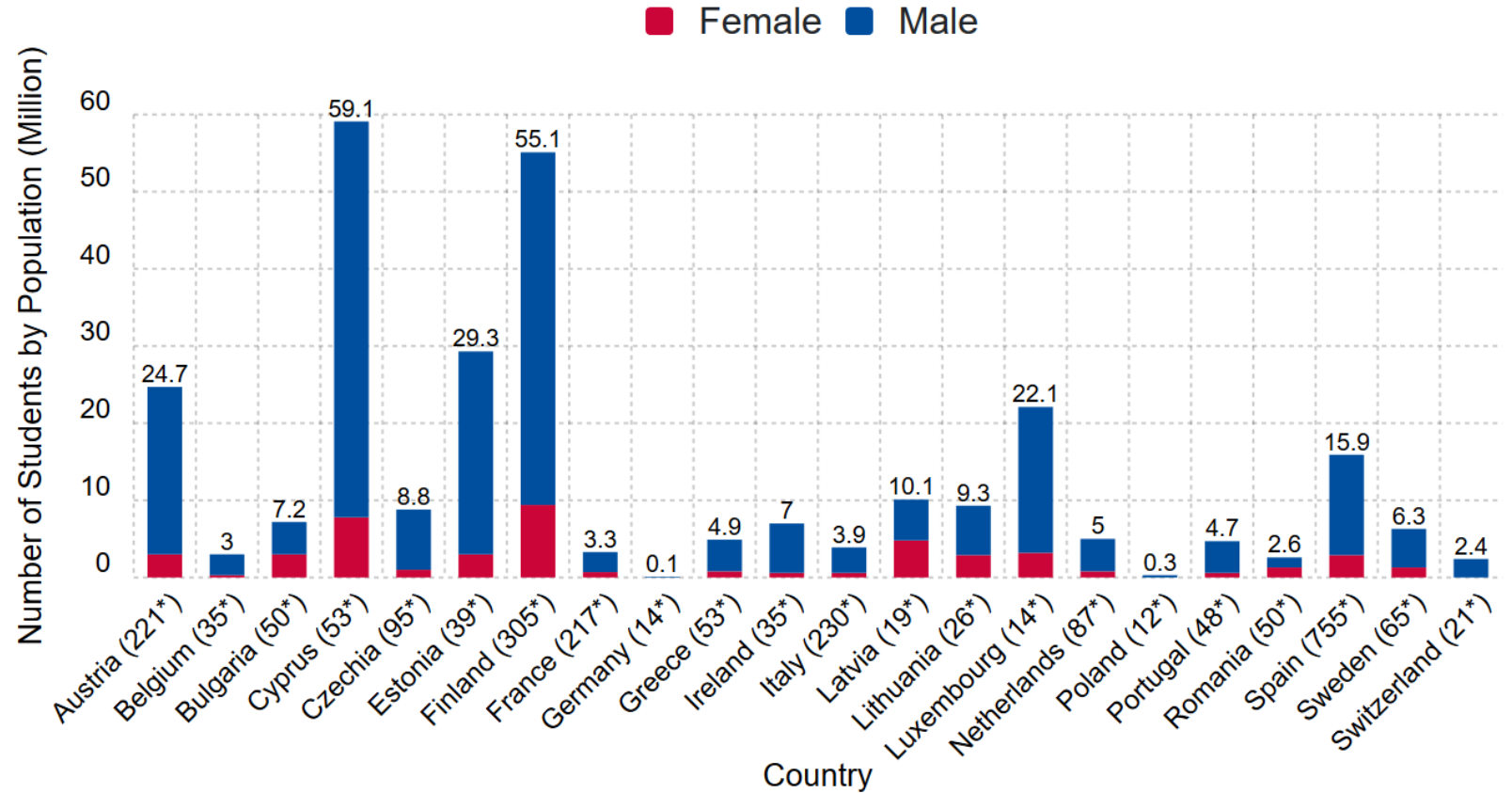
- The increase in graduates can primarily be linked to the introduction of new programmes
- Projections for graduates based on expected graduation dates for Bachelor and Master programmes

# Gender balance still a key issue

## New Students Enrolled by Gender



## Graduates by Population



# Recommendations

- **Increase enrolments and eventually graduates** in cybersecurity programmes through:
  - **the diversification of the Higher Educational Institutes' (HEIs) curricula** in terms of content, levels and language.
  - **the provision of scholarships**, especially for underrepresented groups, and more active efforts to promote cybersecurity as a diverse field.
- Promote analysis of the cybersecurity **market needs and trends** through:
  - the identification of **metrics showing the extent of the problem and possible measures to cope with it.**
- **Increase collaborations** between Member States in:
  - **launching European cybersecurity initiatives with shared objectives.**
  - **Sharing of the outputs of programmes** (including results and lessons learnt).



# Thank you!

## Dr Jason R.C. Nurse

Associate Professor in Cybersecurity, University of Kent  
Visiting Academic in Cybersecurity, University of Oxford  
Visiting Fellow in Defence & Security, Cranfield University

 [j.r.c.nurse@kent.ac.uk](mailto:j.r.c.nurse@kent.ac.uk)

 [jasonnurse](https://twitter.com/jasonnurse)

 [jasonrcnurse](https://www.linkedin.com/in/jasonrcnurse)