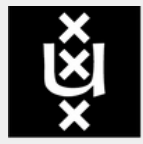


UNIVERSITY OF AMSTERDAM  
Institute for Interdisciplinary Studies



# Master Forensic Science

*Information Session, 15 February 2024,  
Yorike Hartman, August de Heij,  
Anne-Celeste de Kruijff*



# Programme Team



*Yorike Hartman*

- Programme coordinator



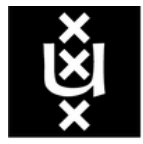
*August de Heij*

- Study adviser



*Anne-Celeste de Kruijff*

- Second year student
- Background Molecular Life Sciences

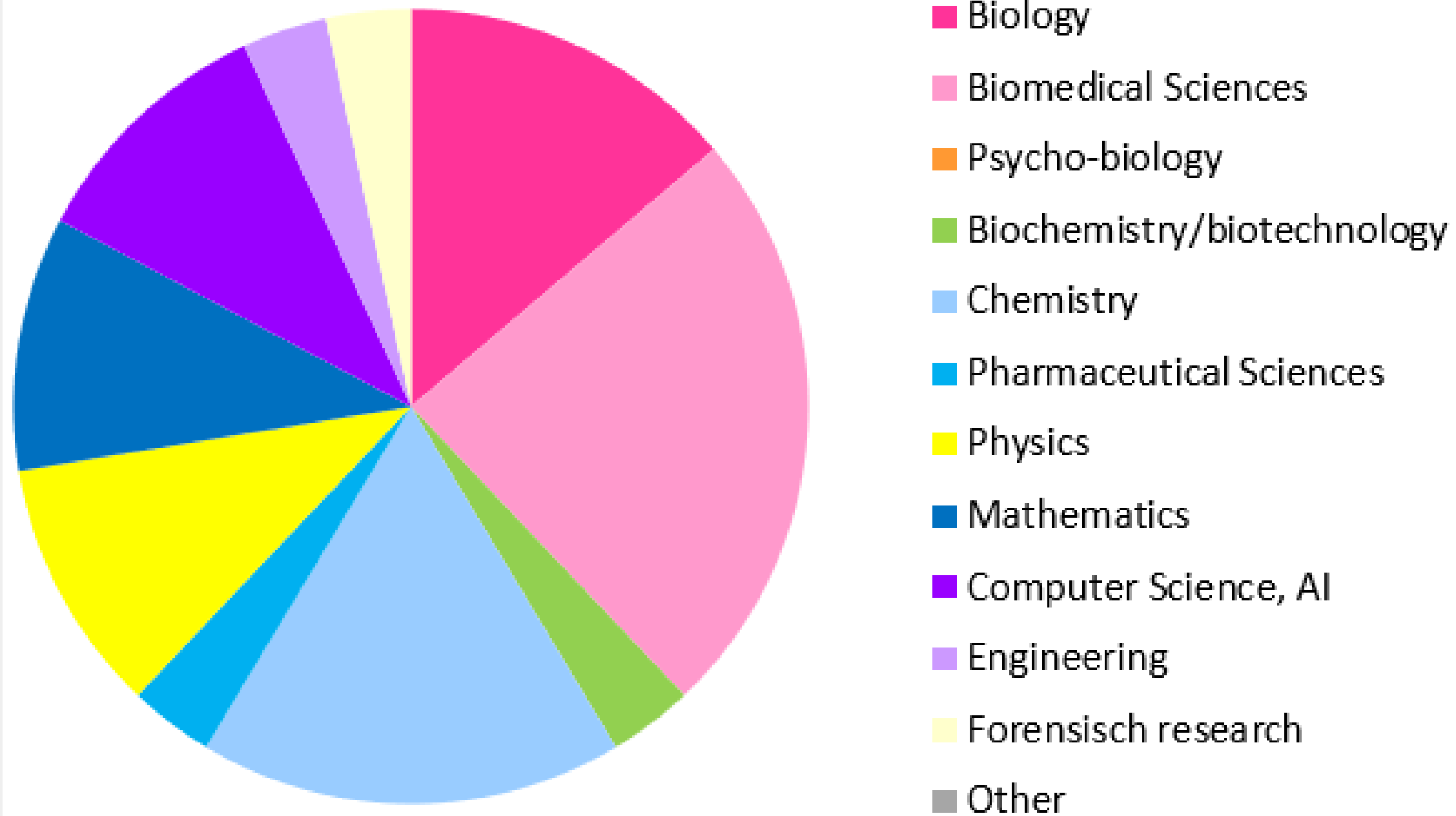


# Take home messages

- **Research not investigation**
- **Theoretical not practical (first year)**
- **Full-time master**
- **Selective**
- **International**
- **In-depth Interpretation of Evidence (first year)**
- **Disciplinary specialisation (second year)**



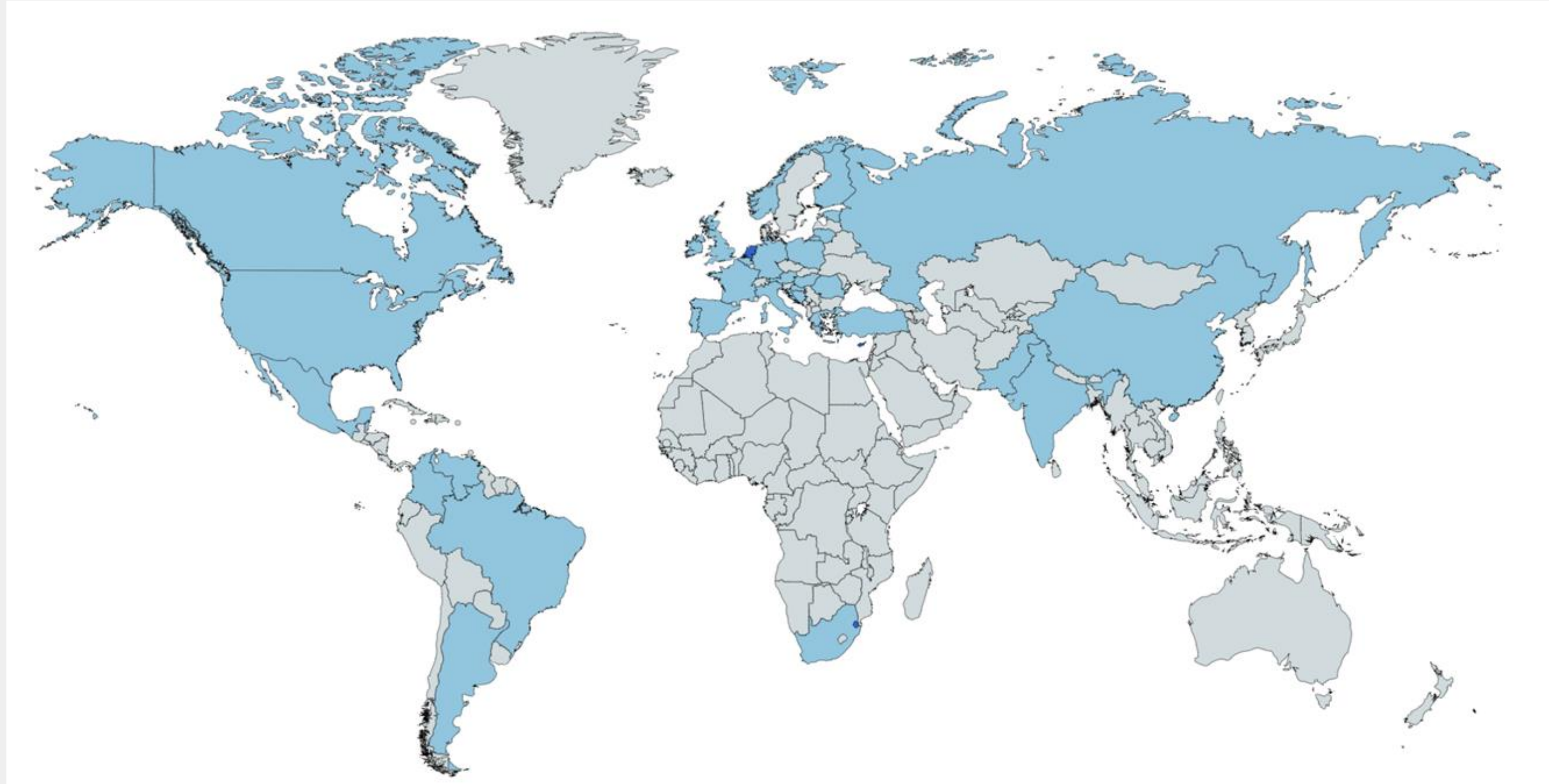
## Overview scientific background 23-24



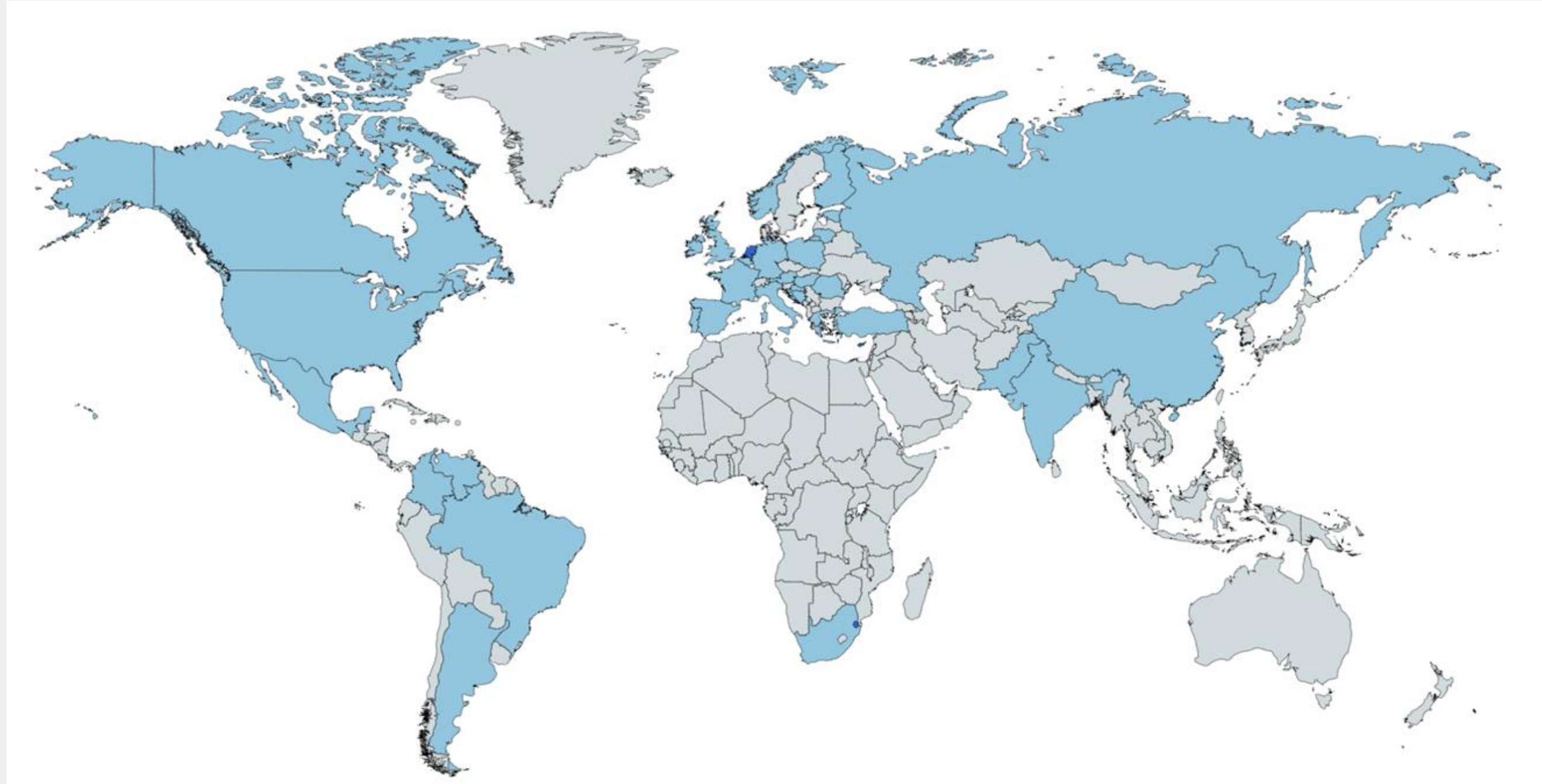
28% international students



**A truly international programme with  
alumni and students from 36 countries**



**A truly international programme with  
alumni and students from 36 countries**



**492 alumni and 74 students**





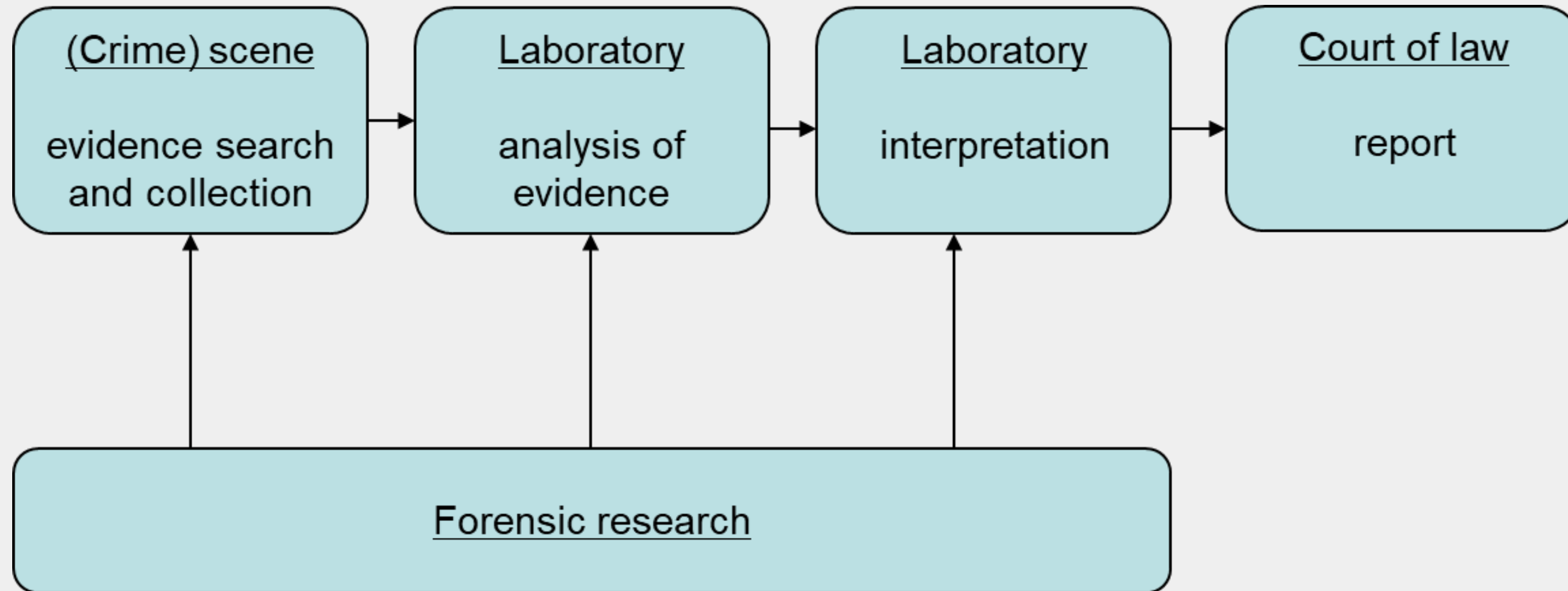
# What has happened here?







# What is forensic science?



**Forensic Science is the application of a broad spectrum of sciences to answer questions of interest to a legal system**





Seeing the big picture &  
Sharp eye for detail



# First year: Seeing the big picture

- **Overview forensic process and areas of expertise**
- **Focus on forensic reasoning**
- **Professional skills: teamwork and communication**
- **Many guest lectures from the forensic field**

<b>Year 1</b>	<b>Criminalistics Applied to Forensic Chemistry</b> (6 EC)	<b>Research and Innovation in Forensic Biophysics</b> (6 EC)	<b>Complex Crime Scenes</b> (6 EC)	<b>Forensic Statistics and DNA evidence</b> (6 EC)	<b>Chain of Evidence</b> (6 EC)	<b>Policy, Ethics and Media</b> (6 EC)
	<b>Statistics for Forensic Science</b> (5 EC)	<b>Logic and the Human Factor in Forensic Reasoning</b> (6 EC)		<b>Cybercrime, Digital Traces and Forensic Data Analysis</b> (6EC)	<b>Criminal Law and Expert Evidence</b> (6 EC)	
<b>Professional Development (2 EC in 2 years)</b>						





# Second year: Sharp eye for detail

## Specialisation in your own expertise

- Advanced Forensic Course
- Disciplinary master courses
- Literature Thesis
- Research project

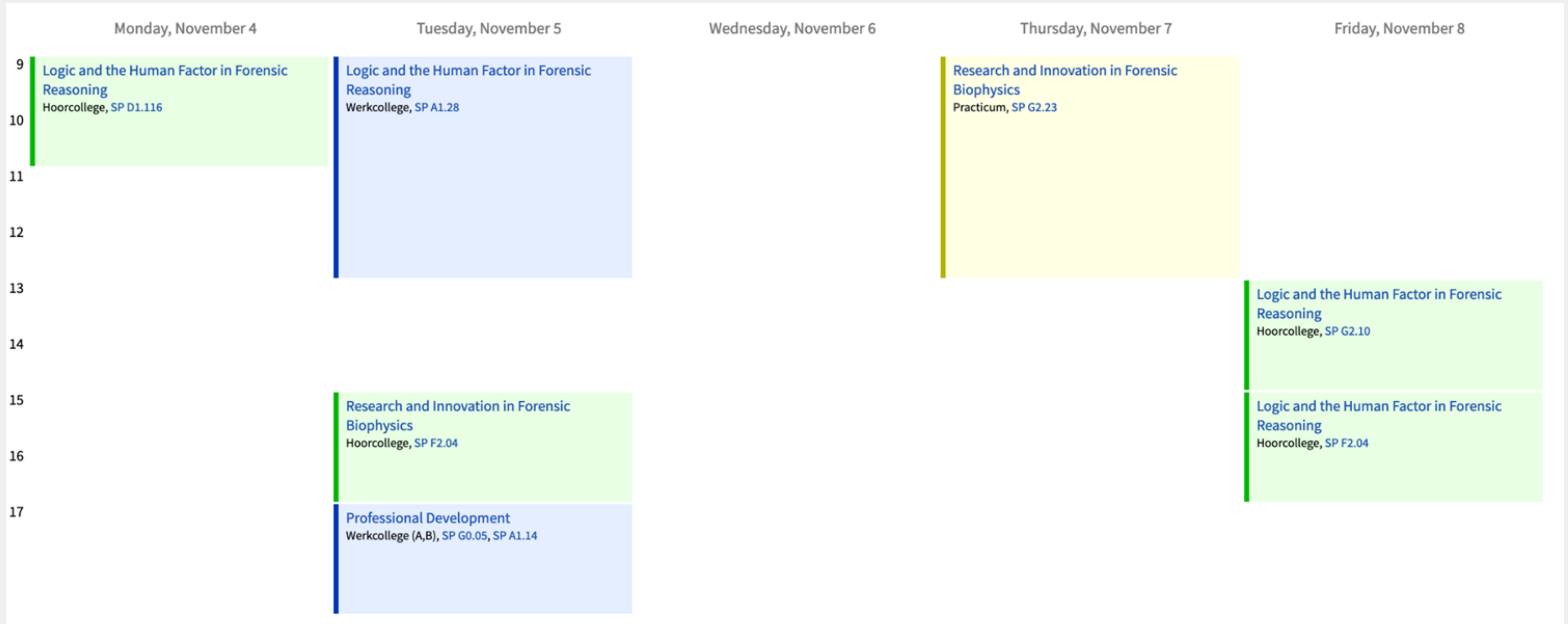
Year 2

<p><b>Specialisation course**</b> Advanced Forensic Biology (6 EC) (4 Weeks)</p>	<p><b>Forensic Elective*</b> Observer Based Techniques <u>or</u> Physical and Forensic Anthropology (6EC) <u>or</u> <b>Specialisation course**</b></p>	<p><b>Research project (36 EC)</b></p> <p>Students need a total of 18 EC for Elective and Specialisation Courses combined or Specialisation Courses only. Therefore: * <b>Elective Courses</b> should add up to 6 EC or no Elective Course is followed ** <b>Specialisation Courses</b> should add up to 12 or 18 EC</p>
<p><b>Specialisation course**</b> (Block 1 or 2)</p>		
<p><b>Literature Thesis</b> (5 EC)</p>		
<p><b>Professional Development (2 EC in 2 years)</b></p>		





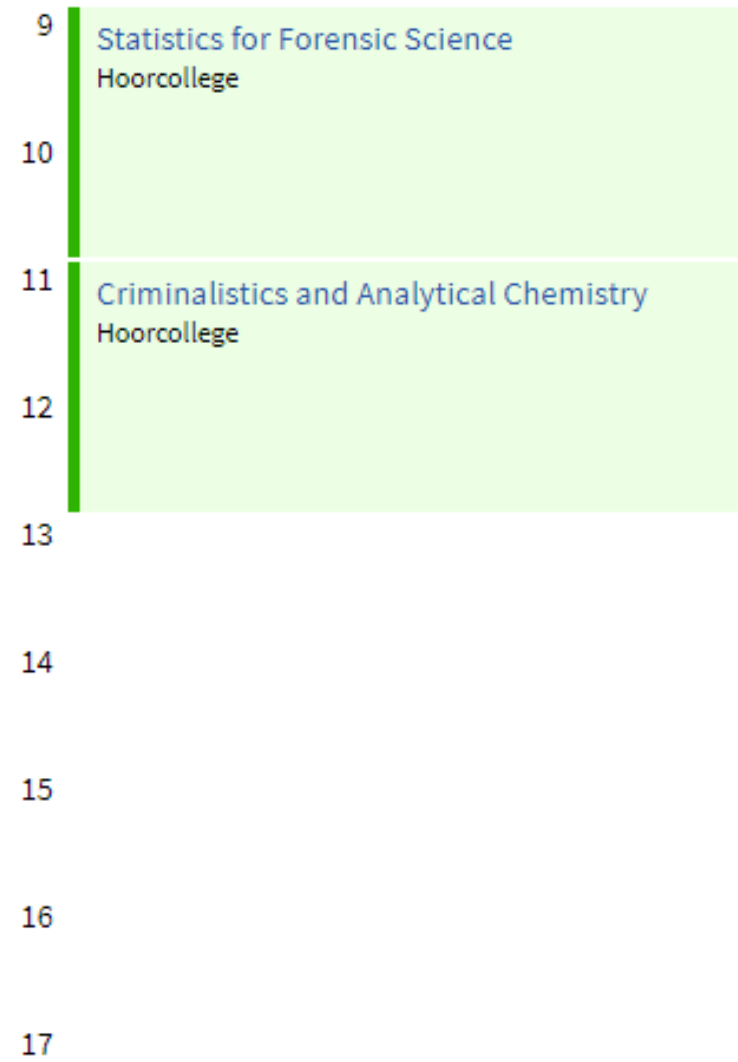
# A week in the curriculum





# A week in the curriculum

Monday, October 3



Tuesday, October 4

Wednesday, October 5

Thursday, October 6

Friday, October 7







# Chain of evidence

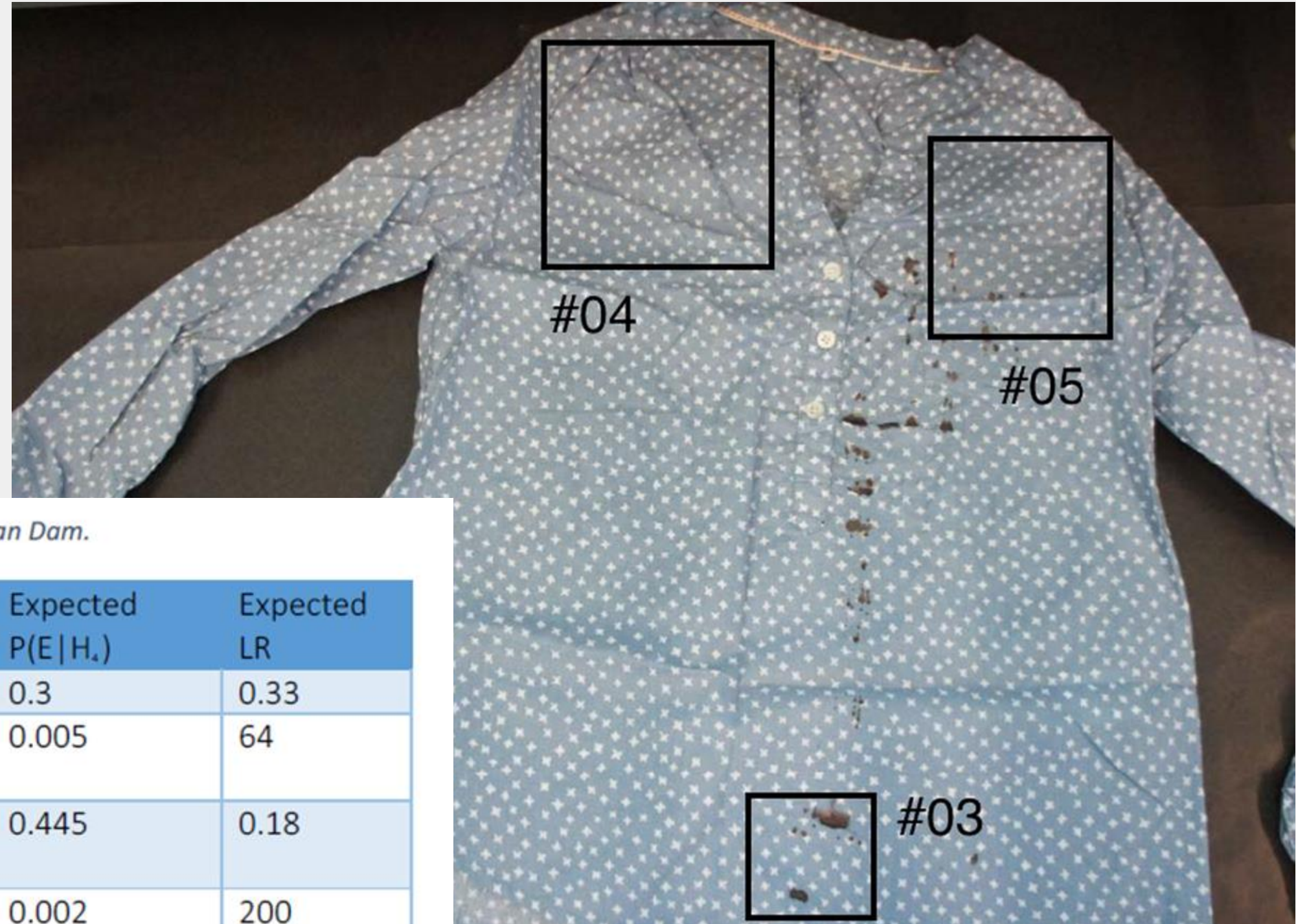


Table 4. Summary of expected values and likelihood ratios for the glass traces from suspect van Dam.

	Expected (E H <sub>s</sub> )	P	Expected P(E H <sub>i</sub> )	Expected LR
No glass fragments are recovered	0.1	0.3	0.33	0.33
Few (0-4) glass fragments are recovered, matching the glass found at the crime scene	0.32	0.005	64	
Few (0-4) glass fragments are recovered, not matching the glass found at the crime scene	0.08	0.445	0.18	
Many (>4) glass fragments are recovered matching the glass found at the crime scene	0.4	0.002	200	
Many (>4) glass fragments are recovered not matching the glass found at the crime scene	0.1	0.198	0.5	





# Moot court







# Excursion







# Literature thesis

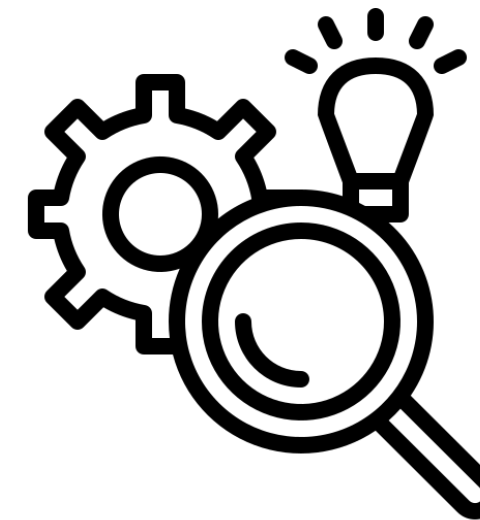
→ *Gunshot- and explosive residue sampling in forensic science*



- Which sampling methods are specifically designed for forensic purposes?
- If the method is not developed for forensic science, what is it?



Netherlands Forensic Institute  
*Ministry of Justice and Security*







# Forensic Research Center

<http://www.clhc.nl>

**CLHC** CO VAN LEDDEN HULSEBOSCH CENTRUM  
AMSTERDAM CENTER FOR FORENSIC SCIENCE AND MEDICINE

Search...

## Co van Ledden Hulsebosch Center

[Home](#) [Organisation](#) [Education](#) [Research](#) [Partners](#) [News and Events](#) [History](#) [Contact](#)

**CLHC**  
Co van Ledden Hulsebosch Center: the interdisciplinary expertise center for forensic scientific and medical research in Amsterdam.

**Programme**  
**4th CLHC Forensic PhD Symposium**  
October 27, 2017  
Amsterdam Science Park Congress Centre

**Latest News**

- > Exhibition of Historical Forensic Material at 4th Phd Forensic Symposium 20-10-2017
- > 4th CLHC Forensic PhD Symposium 16-10-2017

CLHC

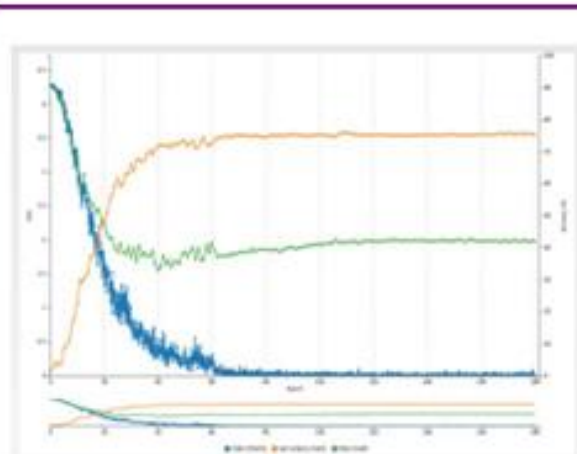




# Digital Forensics



# Forensic Statistics



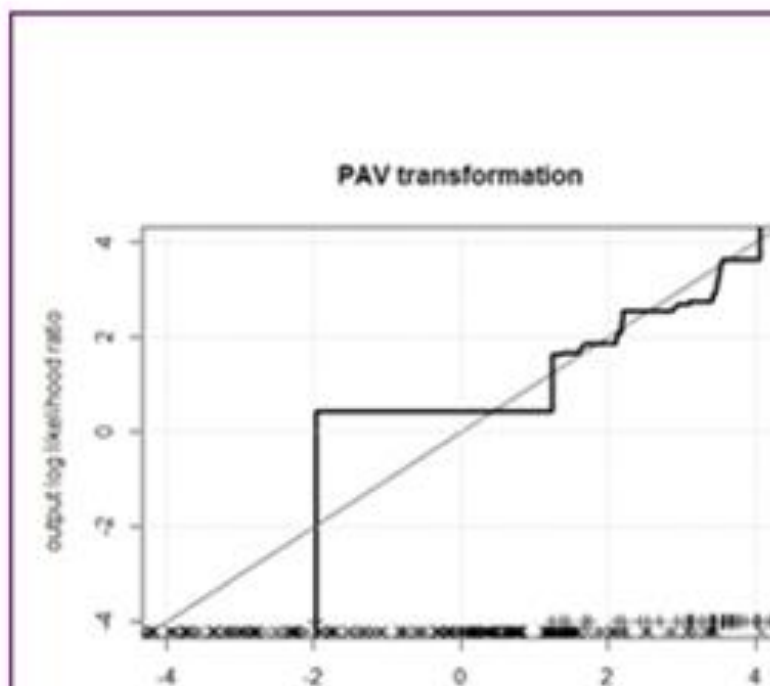
Graphical interpretation of the performance of the model-180 epochs were used. The accuracy plateaus at 75.4% while the loss (val) is 1.9.

test Image Classification Model



Predictions	
T-shirt	0.999
Blouse	0.001
Dress	0.000
Jeans	0.999

Student	Marianna Bedeli
Research carried out at	NFI
Supervisor	Prof. Dr. Ing. Zeno Geradts
Title thesis	Clothing identification via deep learning: forensic applications
Abstract	<p>Usually, people can be described based on their clothing, which can be considered a visual cue to facilitate the process of identifying individuals. The research project aims to identify people based on the visual information that can be drawn from the attire they wear. Deep learning has been applied in this project in order to train the computer in classifying images with clothing content. Initially, the research involves clothing type classification in a large scale dataset. Unfortunately, the model performs poorly on the large scale dataset. In addition to that, the second part of the research applies clothing attribute classification in a dataset containing popular logos and famous brands images. The results show that the model</p>



A PAV transformation of LR's

Student	Yara van Schaik
Research carried out at	Dutch Forensic Institute (NFI)
Supervisor	Dr Peter Vergeer
Title thesis	Measuring calibration of likelihood ratio systems
Abstract	<p>When forensic evidence is examined, the conclusions are summarized by a weight of evidence, most commonly the likelihood ratio. There are several methods to calculate these ratios and good performance of such models is essential. Calibration is a performance characteristic and this property can be measured. Different methods to measure the calibration of an LR system are available, and four of them are</p>





And many more fields...

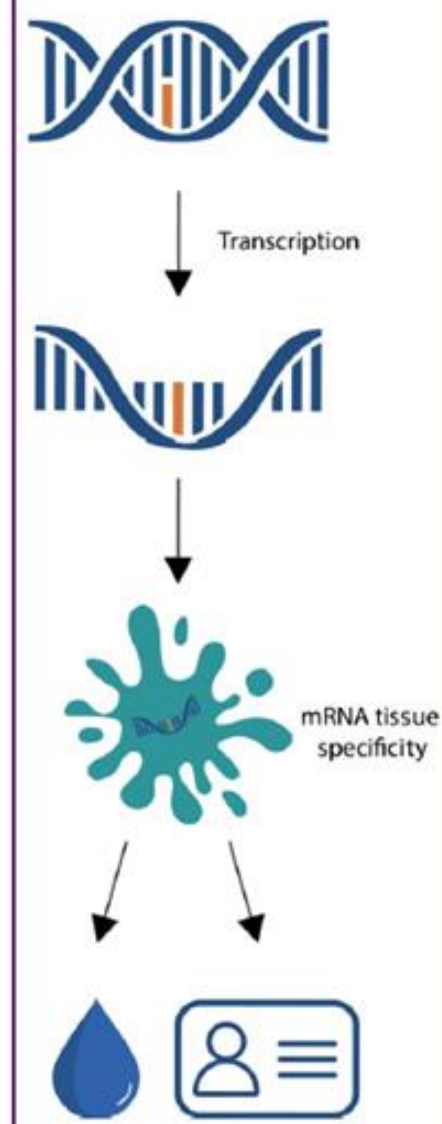


Forensic Biology

<http://www.uva.nl/mfs>

Overview of our students' projects

<b>Student</b>	<b>Simao Ribeiro Margarido</b>
<i>Research carried out at</i>	NFI
<i>Supervisor</i>	Margreete van den Berge
<i>Title thesis</i>	Variation in body fluid specific mRNAs: can cell type and donor be associated?
<i>Abstract</i>	<p>In recent years, efforts have been made to associate donors with body fluids found on stains. Although it can be easy to do this in single donor samples and in samples with one male and one female donor and only sex specific cells, in other cases it is normally challenging. In the past, four interns at the NFI have contributed to this field of research, with the first investigating six different body fluids as a proof of principle, the following two increasing the discrimination power for blood and semen, and the last one investigating the assays in mixed samples. The aim of this study was to increase the discrimination power for saliva samples by investigating saliva-specific genes. This was achieved by identifying 42 SNPs in 12 saliva-specific genes. A multiplex set was developed on DNA level, achieving a discrimination power of 69%. Twenty-seven of the 42 SNPs were observed in 86 donors and two new SNPs were posteriorly added to the assay, so, in total, 29 SNPs were observed. Although the discrimination power is already relatively high, it might still be possible to increase it by adding new markers. However, it needs to be done carefully, as the addition of markers that might be expressed in other body fluids in addition to saliva might jeopardise the analysis. Two multiplex sets were synthesised for RNA, however, they could not be sequenced upon the submission of this report. The two sets differ by one marker, which was included to understand how it interferes with the other markers. If the extra marker is added the discrimination power drops to 65%, but if not, it drops to 57%. Although the donors (DNA SNPs) and cell type (RNA SNPs) could not be associated in practice, the markers were chosen for their specificity in saliva, so, as a proof of principle, the results are promising for the association of donors to saliva samples. At the moment, donors are being tested on RNA level using two newly developed multiplexes. The next step is to associate those results with the results on DNA level to ascertain if they can in fact be linked.</p>



Zoom

<b>First year</b>
<b>Second year</b>
<b>Degree requirements</b>



**Research projects**

Students finish the programme by carrying out a research project to expand their scientific professional skills. This research can be done in the Netherlands or abroad, within or outside the institute, a police department or with other organizations in which forensics play a role. Topics range from epigenetics to fire investigation to cybercrime and more.

- ↓ [Research Project Guide MFS UvA 2019-2020](#)
- ↓ [Research Project Guide MFS UvA 2018-2019](#)
- ↓ [Research Project Guide MFS UvA 2017-2018](#)

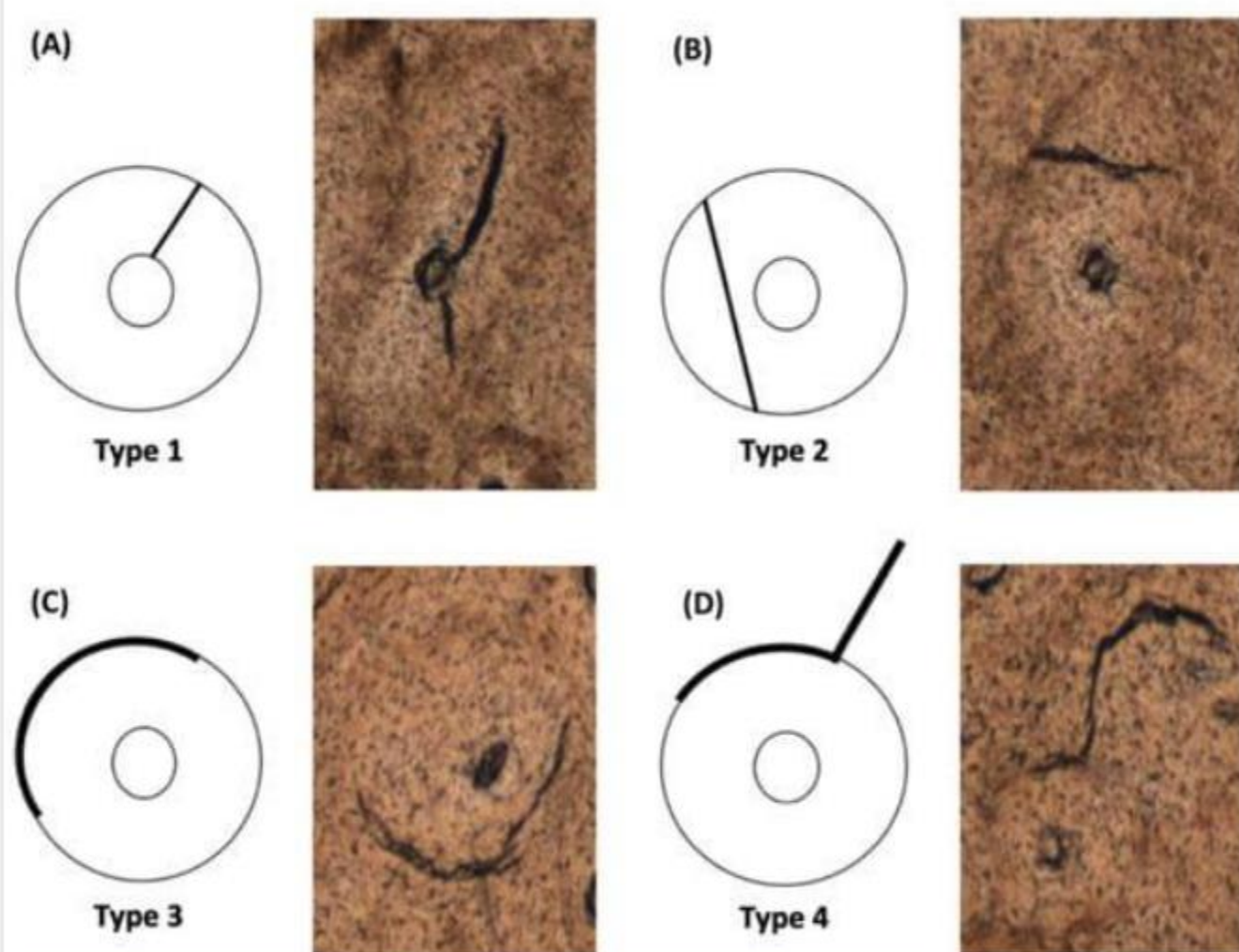




Article

# Osteonal Damage Patterns from Ballistic and Blunt Force Trauma in Human Long Bones

Keira Sexton <sup>1,2</sup>, Nathalie Schwab <sup>2,3</sup>, Ignasi Galtés <sup>2,4,5,\*</sup>, Anna Casas <sup>3</sup>, Nuria Armentano <sup>3</sup>, Pedro Brillas <sup>6</sup>, Xavier Garrido <sup>7</sup> and Xavier Jordana <sup>3,8,\*</sup>



Article

# Rapid and On-Scene Chemical Identification of Intact Explosives with Portable Near-Infrared Spectroscopy and Multivariate Data Analysis

Irene M. van Damme <sup>1,2,\*</sup>, Pol Mestres-Fitó <sup>1</sup>, Henk-Jan Ramaker <sup>3</sup>, Annemieke W. C. Hulsbergen <sup>2</sup>, Antoine E. D. M. van der Heijden <sup>4</sup>, Ruben F. Kranenburg <sup>1,5</sup> and Arian C. van Asten <sup>1,2,6</sup>





# Events: Frontiers of Forensic Science & Annual Symposium

UNIVERSITY OF AMSTERDAM  
Institute for Interdisciplinary Studies

CLHC  
Co van Ledden Hulsebosch Center

SAXION  
UNIVERSITY OF APPLIED SCIENCES

POLITIEACADEMIE

KIVI

MFS  
MASTER FORENSIC SCIENCE

LECTURE SERIES FRONTIERS OF FORENSIC SCIENCE

## Symposium

### How can advanced technologies boost criminal investigations?

10:00 - 10:30  
**Welcome**

10:30 - 11:00  
**Caroline Gibb**  
Computer-assisted consensus among fingerprint examiners – The future of forensic examination?

11:00 - 12:00  
**Workshop round I**

12:00 - 13:00  
**Lunch**

13:00 - 14:00  
**Workshop round II**

14:00 - 14:30  
**Stefan Zimmermann**  
Ion mobility spectrometry: How can new concepts pave the way into criminal investigations?

14:30 - 15:00  
**Coffee/Tea break**

15:00 - 15:30  
**Hanleh Bazyar**  
Forensics-on-a-chip: How and where to apply microfluidics in the forensic field?

15:30 - 16:00  
**Ruben Kranenburg**  
How can NIR spectroscopy contribute to rapid, on-scene and court-admissible drug identification?

16:00  
**Drinks**

**Wednesday, June 7<sup>th</sup>, 2023**  
**10:00 - 18:00**

**Police Academy**  
**Arnhemseweg 348, Apeldoorn**  
**Free admission**

**To register, click or scan:**



The lecture series is an initiative of the Co van Ledden Hulsebosch Center (CLHC) and the Master's Programme in Forensic Science at the Institute for Interdisciplinary Studies, UvA.

UNIVERSITY OF AMSTERDAM  
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CLHC  
Co van Ledden Hulsebosch Center

Wildlife Forensic Academy

MFS  
MASTER FORENSIC SCIENCE

LECTURE SERIES FRONTIERS OF FORENSIC SCIENCE

## Wildlife Forensic Academy

15:00 - 15:05  
**Welcome**

15:05 - 15:50  
**Andro Vos**  
(Wildlife Forensic Academy)  
**Introducing the Wildlife Forensic Academy**

15:50 - 16:10  
**Greg Simpson**  
(Wildlife Forensic Academy)  
**On-line tour of the Wildlife Forensic Academy**

16:10 - 16:35  
**Noa van Handel**  
(student Forensic Science, Amsterdam University of Applied Sciences)  
**A forensic toolkit to improve forensic knowledge related to baboon crime scenes**

16:35 - 17:00  
**Thomas Shehata**  
(student Master Forensic science, University of Amsterdam)  
**Non-human bloodstain age determination using reflectance spectroscopy**

17:00  
**Social drinks**

**Friday, October 6<sup>th</sup>, 2023**  
**15:00 - 17:00**

**Amsterdam Science Park**  
**Building 904, Room C1.110**

**Free admission**

**To register, click or scan:**



The lecture series is an initiative of the Co van Ledden Hulsebosch Center (CLHC) and the Master's Programme in Forensic Science at the Institute for Interdisciplinary Studies, UvA.

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## Recent Advances in Forensic (Epi)Genetics

15:00 - 15:05  
**Titlia Sijen**  
(Netherlands Forensic Institute)  
**Welcome**

15:05 - 15:30  
**Athina Vidaki**  
(Erasmus MC)  
**Epigenetic aging of the human Y-chromosome**

15:30 - 15:55  
**Kris van der Gaag**  
(Netherlands Forensic Institute)  
**Distinguishing monozygotic twins – a case example**

15:55 - 16:20  
**Desiree de Bruin**  
(Amsterdam UMC)  
**Nanopore sequencing: an all-in-one forensic DNA technology?**

16:20 - 16:45  
**Lisa Graaf**  
(Netherlands Forensic Institute)  
**Myositis, creating investigative leads between child abandonment cases through kinship analysis**


17:00  
**Social drinks**

**Friday, November 17<sup>th</sup>, 2023**  
**15:00 - 17:00**

**Science Park 900, Amsterdam**  
**Building Lab42, Room L1.01**

**Free admission**

**To register, click or scan:**

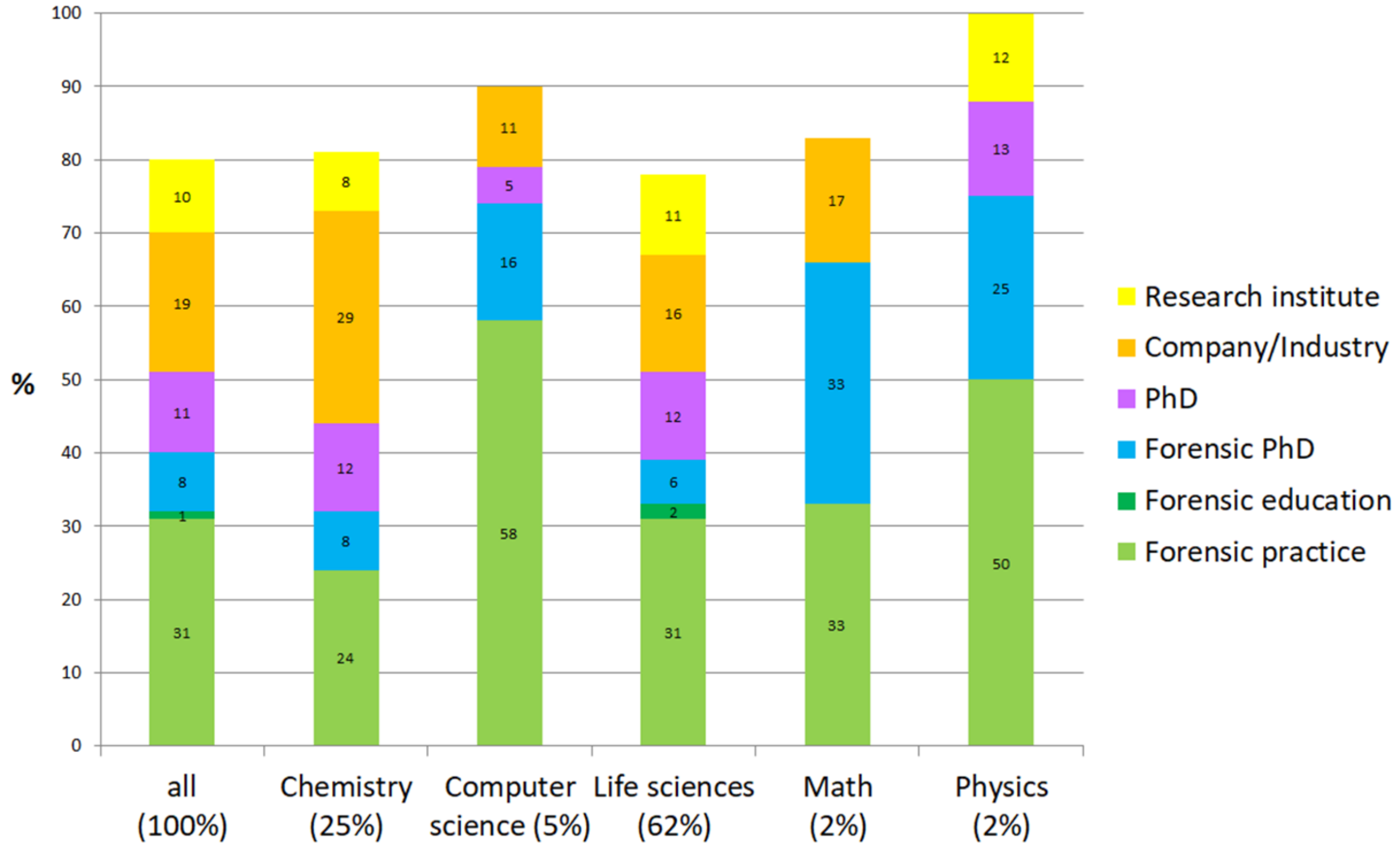


The lecture series is an initiative of the Co van Ledden Hulsebosch Center (CLHC) and the Master's Programme in Forensic Science at the Institute for Interdisciplinary Studies, UvA.





### Overview alumni MFS (Main job within 5 years after master)





Forensic advisor



Consultant Forensic Technology

# Career examples





Forensic advisor



Consultant Forensic Technology

# Career examples



PhD student: “Using drones and remote sensing to locate clandestine graves.”



PhD student: “From identification to a chemical fingerprint for explosives in forensic research”



Forensic Expert: DNA Analyst



Forensic advisor



Consultant Forensic Technology



Forensic Weapons expert

# Career examples



PhD student: “Using drones and remote sensing to locate clandestine graves.”



Forensic Expert: Data scientist  
– Team High Tech Crime

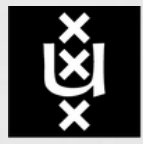


PhD student: “From identification to a chemical fingerprint for explosives in forensic research”



Forensic Scientist - Crime Scene Unit  
at Forensic Science Institute, State Criminal Police Office Berlin





# Application & admission



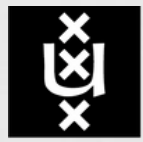
## Application

- Procedure see: [uva.nl/mfs](https://uva.nl/mfs)
- Reference letter from an academic staff member
- Motivation letter
- Deadlines:
  - Dutch/EU: April 30<sup>th</sup>, 2024
  - Non-EU: January 31<sup>st</sup>, 2024

## Admission

- By assessment committee
- Assessment interview





UNIVERSITY OF AMSTERDAM  
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## More information



<http://www.uva.nl/mfs>

<http://www.clhc.nl>

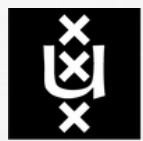
August de Heij:

[studieadviseur-iis@uva.nl](mailto:studieadviseur-iis@uva.nl)

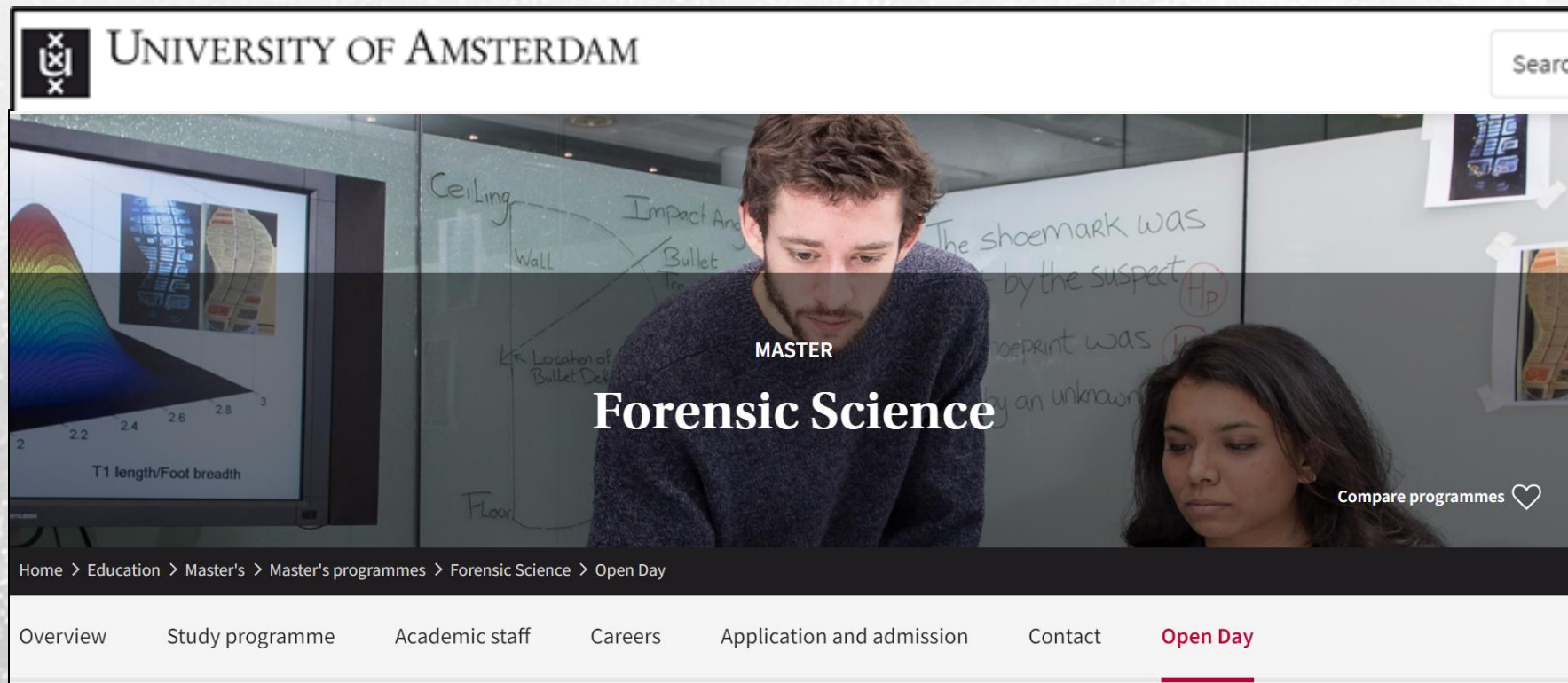
Programme:

[fs-iis-science@uva.nl](mailto:fs-iis-science@uva.nl)



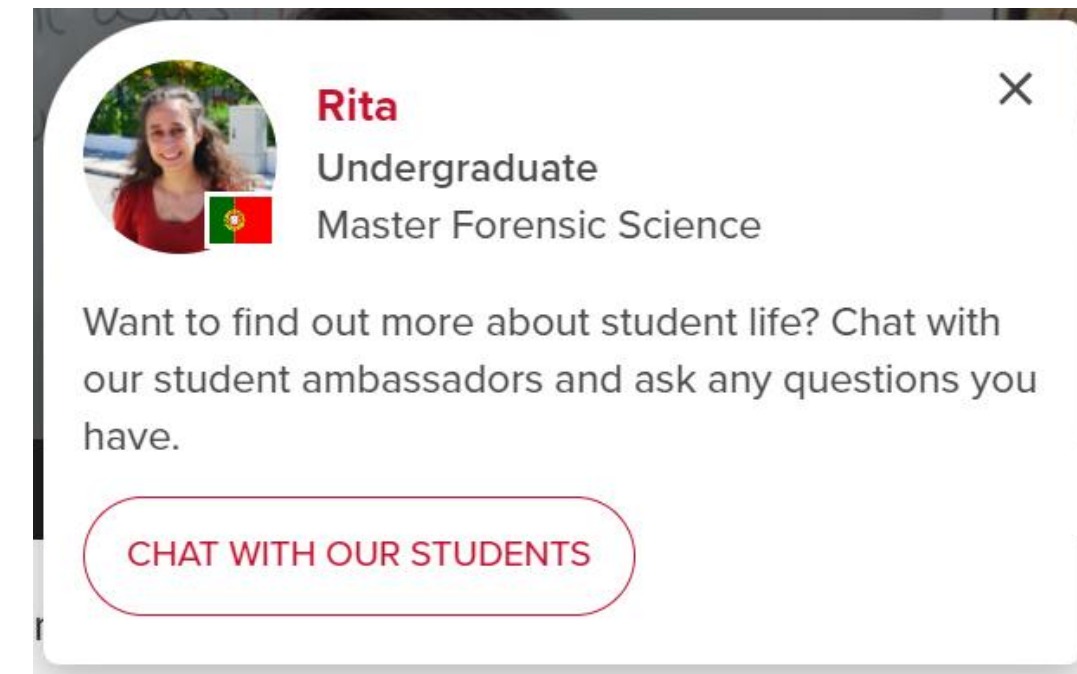


# More information



<http://www.uva.nl/mfs>

Chat via Unibuddy



## Meet the Master

Want to know if Forensic Science suits you?  
Accompany a Master's student in their daily study routine and find out!

[Yes, sign me up!](#) →



# Curriculum



## Curriculum MSC Forensic Science 2024-2025

		Semester I			Semester II		
		Block 1 (8 weeks)	Block 2 (8 weeks)	Block 3 (4 weeks)	Block 4 (8 weeks)	Block 5 (8 weeks)	Block 6 (4 weeks)
Year 1		Criminalistics Applied to Forensic Chemistry (6 ECTS)	Research and Innovation in Forensic Biophysics (6 ECTS)	Complex Crime Scenes (6 ECTS)	Forensic Statistics and DNA evidence (6 ECTS)	Chain of Evidence (6 ECTS)	Policy, Ethics and Media (6 ECTS)
		Statistics for Forensic Science (5 ECTS)	Logic and the Human Factor in Forensic Reasoning (6 ECTS)		Cybercrime, Digital Traces and Forensic Data Analysis (6 ECTS)	Criminal Law and Expert Evidence (6 ECTS)	
Professional Development (2 ECTS in 2 years)							
Year 2		Specialisation course** Advanced Forensic Biology (6 ECTS) (4 Weeks)	Forensic Elective* Observer Based Techniques <u>or</u> Physical and Forensic Anthropology (6 ECTS) <u>or</u> Specialisation course**		Research project (36 ECTS)	Students need a total of 18 ECTS for Elective and Specialisation Courses combined or Specialisation Courses only.  Therefore: * <b>Elective Courses</b> should add up to 6 EC or no Elective Course is followed ** <b>Specialisation Courses</b> should add up to 12 or 18 ECTS	
		Literature Thesis (5 ECTS)					
Professional Development (2 ECTS in 2 years)							