

Co van Ledden Hulsebosch Center ANNUAL REPORT 2019 ▶



Amsterdam UMC,
location AMC



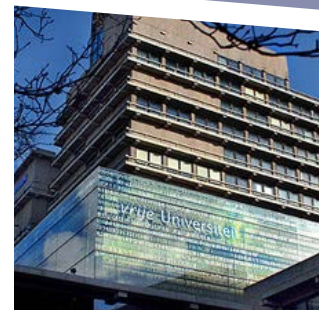
University of Amsterdam
Faculty of Science
(FNWI)



Netherlands
Forensic Institute
(NFI)



Amsterdam University
of Applied Sciences
(HvA)



VU University Amsterdam
Faculty of Science and Earth
and Life Sciences (VU)



Delft University - Faculty of
Mechanical, Maritime and Materials
Engineering (3mE)



Avans University
of Applied
Sciences



ANNUAL REPORT CO VAN LEDDEN HULSEBOSCH CENTER 2019

Maurice Aalders and Arian van Asten

with contributions of Rick van Rijn, Roelof-Jan Oostra, Udo Reijnders, Peter Schoenmakers, Ate Kloosterman, Pernette Verschure, Zeno Geradts, Jaap van Ginkel, Marjan Sjerps, Bert van Es, Eva de Rijke, Hans Breeuwiers, Daniel Bonn, Lisette Kootker, Gareth Davies, Christianne de Poot, Arjo Loeve, Ben de Rooij and Annemieke de Vries.

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INTRODUCTION

In 2019 the CLHC reported its first 3-year evaluation covering the period 2016-2018. Because the evaluation report was not published externally, this 2019 annual report will feature some of the main findings and conclusions of the evaluation. The results of 2019 will be discussed in light of the recommendations of the CLHC Steering Group on the basis of this evaluation. The theme of the annual CLHC conference organized on the 25th of October 2019 was 'Crossing Borders' and was dedicated to CLHC professor Zeno Geradts, the first foreign president of the AAFS (American Academy of Forensic Sciences). At the time this annual report was written, the AAFS 2020 conference in Anaheim, USA was successfully concluded. In the annual report of 2020, the CLHC events at the AAFS 2020 and the

experiences of the AAFS president will be discussed. This year the mini-interview will feature dr Annemieke de Vries, the first director Science and Technology in the history of the Netherlands Forensic Institute. In the mini-interview she will give her views on forensic science, future developments and the added value of the CLHC for the renowned and internationally acclaimed Dutch forensic institute.

In this annual CLHC report the results are not only listed and analysed in terms of quality and quantity but also categorized according to a number of key activity areas for the CLHC. These areas are indicated via icons throughout the document:

Scientific Impact



Funding



International
Network



Education



Society



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ORGANIZATION

Currently the network contacts within CLHC organization are well established and the following Amsterdam UMC, UvA, VU, HvA, TU Delft, Avans and NFI colleagues played an important role in the Center in 2019:

Dean FNWI

Chair and dean Amsterdam UMC

Director Science and Technology NFI

Board chair - Amsterdam UMC

Board chair - FNWI

Board member - NFI

Board member - HvA

Board member - VU

CLHC director - Amsterdam UMC

CLHC director - FNWI

Education coordinator FNWI (MFS program)

Education coordinator - AUMC

Bureau support - FNWI

Bureau support - Amsterdam UMC

Coordination BMEPh - Amsterdam UMC

Coordination Radiology - Amsterdam UMC

Peter van Tienderen

Hans Romijn

Annemieke de Vries

Ton van Leeuwen, Jaap Stoker

Peter Schoenmakers, Eric Opdam

Annemieke de Vries

Esther Ras

Gareth Davies

Maurice Aalders

Arian van Asten

Arian van Asten, Yorike Hartman

Rick van Rijn, Roelof Jan Oostra

Eric Sennema

Gepke Uiterdijk

Maurice Aalders (Ton van Leeuwen)

Rick van Rijn (Jaap Stoker)

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Coordination Anatomy, Anthropology,

Pathology – Amsterdam UMC

Coordination First line Forensic Medicine –

Amsterdam UMC/GGD

Coordination HIMS – FNWI

Coordination IBED – FNWI

Coordination IoP – FNWI

Coordination Ivi – FNWI

Coordination KdVI – FNWI

Coordination SILS – FNWI

Coordination HvA & VU-Law

Coordination VU – Science

Earth Sciences

Mathematics

Bioanalysis

Coordination TU Delft – 3mE

Coordination Avans

Roelof-Jan Oostra, Hans de Boer

Udo Reijnders

Arian van Asten (Peter Schoenmakers)

Eva de Rijke, Hans Breeuwer

Daniel Bonn

Jaap van Ginkel, Zeno Geradts

Bert van Es, Marjan Sjerps (Eric Opdam)

Pernette Verschure, Titia Sijen (Ate Kloosterman)

Christianne de Poot

Lisette Kootker (Gareth Davies)

Klaas Slooten (Ronald Meester),

Rob Haselberg (Govert Somsen)

Arjo Loeve

Ben de Rooij

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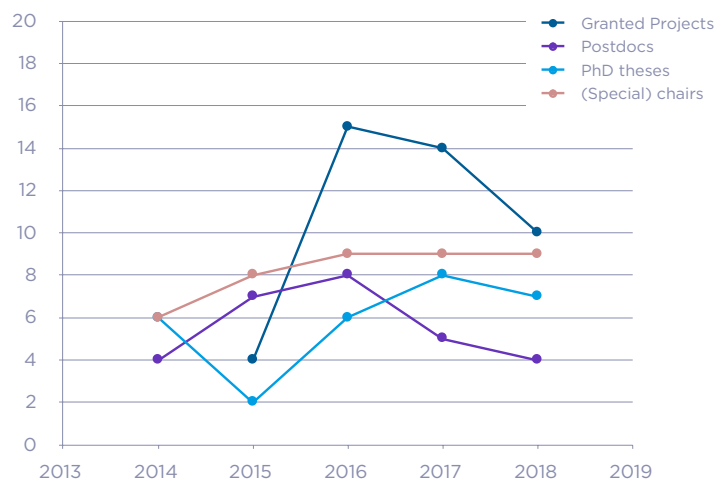
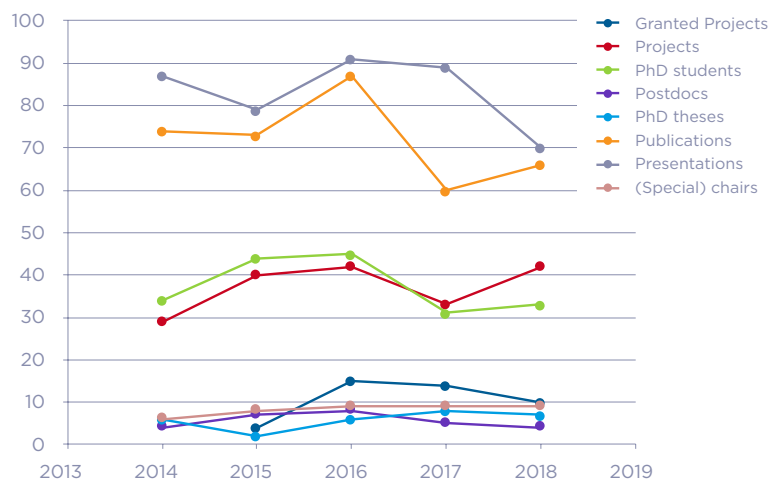
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THREE-YEAR EVALUATION 2016-2018

The three-year evaluation 2016-2018 was based on data available on the magnitude and variety of the forensic activities, on a strategic assessment by the CLHC Board and Steering Group and on a survey reflecting the opinion of partners and associated stakeholders. The data indicates a sizeable but somewhat constant size of the forensic scientific activities within the CLHC.



Number of granted projects, ongoing projects, PhD students, postdocs, PhD theses, (special) chairs in forensic science and scientific publications and presentations per year in the period 2014-2018

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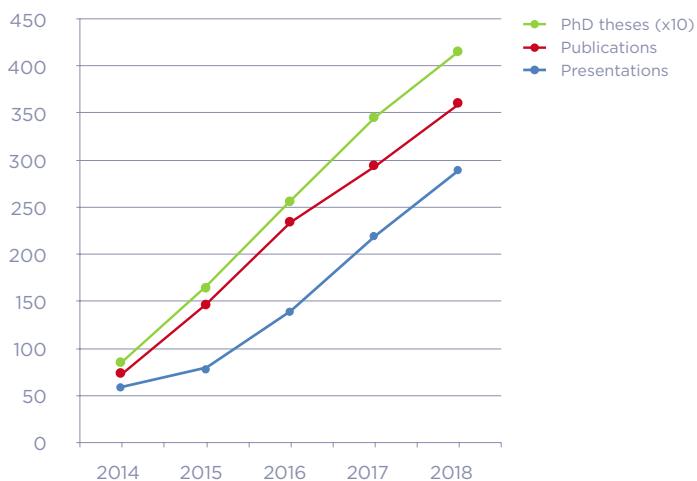
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Since the official start of the CLHC in September 2013, the center has reported 30-50 PhD students/projects at any given time resulting in annually 60-90 academic publications and 70-90 scientific presentations. This indicates that within the CLHC there is a delicate equilibrium between concluding projects (e.g. when PhD students successfully defend their thesis) and new activities and initiatives. From a cumulative perspective this translates into a linear increase of the overall forensic scientific output:



Cumulative total of PhD theses (number of PhD theses has been multiplied by 10 to provide sufficient detail) and scientific publications and presentations of the CLHC partners in the period 2014-2018

The impact and quality of the forensic science activities within the CLHC are more difficult to assess quantitatively. The forensic PhD theses are in general of a high international standard and are typically based on

at least 3 scientific papers published in peer-reviewed forensic or science domain specific journals. The top 10 most impactful publications in 2016 were cited 2-5 times above the impact factor of the corresponding journal (impact factors in the range of 1-7). The top 10 CLHC publications of 2016 were cited in total 225 times (including self-citations) in a period of 2 years which on average corresponds to 11 citations per year.

An ongoing challenge for the CLHC partners is to find external budget for forensic research activities. By submitting project proposals funding can be acquired to hire temporary scientific staff for forensic scientific research. However, writing proposals is a laborious process and return on investment is not guaranteed as success rates vary and forensic proposals need to compete with initiatives from other science domains. Because of the complex portfolio of forensic projects with partial funding schemes and in-kind contributions an accurate number on acquired research budget cannot be provided. However, in the period 2016-2018 the total reported external funding was estimated at roughly 2000 keuro.

Another very important but difficult to quantify aspect of forensic scientific efforts of the CLHC is its impact on forensic practice. Forensic science is always conducted with a relevant application in mind, by providing new insights, methods and technology that successfully can be employed in criminal investigations to provide answers to relevant questions. Whether new forensic science options are structurally employed by experts in case work depends on several factors including

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relevance, frequency, robustness, ease of use and quality assurance. In the period 2016-2018 forensic innovation within the CLHC resulted in 6 new technological developments for forensic casework. Roughly 15% of all CLHC associated scientific publications are directly related to casework or are addressing a question originating from casework.

In the strategic analysis the CLHC Board and the Steering Group assessed to what extent key strategic goals of the center were realized since its start in 2013 :

The survey provided additional views from the partner institutes and the forensic network on the role and function of the CLHC. It is beyond the scope of this annual report to discuss the outcomes of the survey in detail, but the overall message was quite consistent yielding valuable insights and sound recommendations.

Strategic Goal	CLHC Board	CLHC Steering Group (n=4)
Realizing a national forensic science program with international impact and recognition	4	3.3
Building a comprehensive forensic knowledge base within the University of Amsterdam	4	4.5
Creating a diverse network of forensic scientists in Amsterdam, in the Netherlands and abroad	4	4.3
Securing ongoing funding for forensic science efforts and projects of the CLHC partners	3	2.5
Contributing to the forensic education program of the UvA and the CLHC partners	5	4.5
Realizing interdisciplinary collaboration of CLHC partners in forensic science and education	4	4
Building CLHC contacts within the Dutch and international criminal justice system	3	4
Introducing new methods in forensic practice from CLHC science and innovation efforts	2	3.5
Boosting CLHC visibility through media use, outreach activities and press coverage	4	4
Securing a stable financial basis and a robust operational framework for the CLHC	5	3.3

1 = not realized, 2 = somewhat realized, 3 = partly realized, 4 = mostly realized, 5 = fully realized

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The following aspects of the CLHC were rated positively by the survey participants:

- The **institute directors** appreciate the connective role of the CLHC between the various academic disciplines and institutes which strengthens connections between students throughout the Netherlands. Also, the active involvement of NFI and police is highly valued.
- **The coordinators** particularly appreciate the high value of the CLHC network for students. The CLHC provides contacts for literature thesis and master thesis projects for the master forensic science students, increases scientific collaborations and, by involving the stake holders, allows the students to work on relevant research topics. The frontiers meetings and the annual symposium are mentioned as valuable.
- The **stakeholders** particularly appreciate the opportunities to get in touch with key players in the forensic education, research and forensic practice such as police and NFI during the CLHC events (frontiers and symposium).

The following aspects of the CLHC were suggested as areas for further improvement by the survey participants:

- The **institute directors** strongly encourage the efforts to turn the CLHC into a national forensic expertise center. Further, it is important to work on coherent national and international funding strategies. Furthermore, the visibility of the CLHC can be increased.

- **The coordinators** specifically mention the need for more (research) funding opportunities and an increased visibility of the CLHC. Also, the need for better academic career opportunities in forensic science is stressed.
- The **Stakeholders** would like to see more interactions with organizations like the police. Furthermore, also this group acknowledges that the visibility of the CLHC can be further increased as well as the general knowledge transfer to a wider audience like the judges and court.

Overall, the 2016-2018 evaluation provided clear directions for the CLHC Board to further develop the center and increase the added value of the forensic science and educations activities even further in the period 2019-2021 :

- The CLHC should lobby for consistent **funding** for forensic science projects.
- The CLHC should enable **interdisciplinary consortia** to submit forensic proposals.
- The CLHC should continue work on the **visibility of the center**, both nationally and internationally.
- The efforts to turn the CLHC into a **nationwide center** must be continued.
- The network should be further **expanded**, particularly involving partners in the criminal justice systems (law enforcement and legal experts).
- The involvement of CLHC researchers in the forensic activities should be increased, especially the **PhD students** should be **more involved** in teaching, student internships and forensic events.
- The **CLHC website** must be updated to increase the value for the stakeholders.

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RESEARCH



Institute	Granted Projects	Ongoing Projects	PhDs/ Postdocs	PhD dissertations	Scientific publications*	Scientific presentations**
BMEPh - AUMC	1	6	5/2	-	7	9
RAD - AUMC	-	6	6/0	2	10	13
AAA - AUMC	-	4	4/0	1	12	13
FMED - AUMC	-	2	2/0	-	3	4
HIMS	2	3	2/0	-	3	5
IBED	-	-	0/1	-	-	1
IoP	-	1	1/0	-	3	1
IvI	1	2	3/0	-	2	0
KdVI	1	-	-	-	3	0
SILS	-	2	1/0	1	10	1
VU	-	2	2/0	-	2	8
HvA	1	7	7/0	-	9	8
3mE - TUD	2	1	-	-	6	2
Avans	1	-	-	-	5	2
Total***	9	36	33 / 3	3	75	67

Forensic science and forensic science related activities within the CLHC institutes in 2019

* Publications that appeared in a printed volume in 2019 (i.e. full reference available) in peer-reviewed scientific journals (including books and book chapters with ISBN numbers)

** Scientific keynote, invited speaker or accepted abstract presentations in official symposia and conferences in 2019

*** The total can be less than the sum of the institute numbers due to collaborations between CLHC institutes.

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Special Chairs

The realization of special chairs is of key importance to develop forensic science areas within the CLHC and to connect forensic practice, science and education. These chairs merge the forensic and academic world and the appointed professors represent research priority areas from which new initiatives and collaborations can be undertaken and proposals can be submitted. The forensic professors within the CLHC are encouraged to establish interdisciplinary collaborations with the academic partners both in Amsterdam, the Netherlands and abroad. In 2019 a total of 7 special chairs and 2 full chairs in forensic science (or with a forensic component) were active within the CLHC network :

Special Chairs in Forensic Science

- **Forensic Statistics @ KdVI/FNWI** –
prof dr Marjan Sjerps (NFI) – 2010-2020 (2nd term)
- **Forensic Biophysics @ BMEPh/AUMC** –
prof dr Maurice Aalders (AUMC) – 2017-2022 (2nd term)
- **Forensic Radiology @ AUMC** –
prof dr Rick van Rijn (AUMC) – 2014-2019 (1st term)
- **Forensic Data Science @ Ivi/FNWI** –
prof dr Zeno Geradts (NFI) – 2014-2019 (1st term)
- **Forensic Medicine @ AUMC** –
prof dr Udo Reijnders (GGD) – 2015-2020 (1st term)
- **Mathematics for Forensic Genetics @ Science/VU** –
– prof dr Klaas Slooten (NFI) – 2015-2020 (1st term)
- **Criminalistics @ Law/VU** –
prof dr Christianne de Poot (WODC/HvA/PA) – 2016-2021 (1st term)

Full Chairs in Forensic Science

- **Forensic Analytical Chemistry and On-Scene Chemical Analysis @ HIMS/FNWI** –
prof dr Arian van Asten – 2018-2035
- **Analytical Chemistry and its applications in Forensic Science @ HIMS/FNWI** –
prof dr Peter Schoenmakers – 2002-2021

The main priority in 2020 will be the succession of emeritus prof dr Ate Kloosterman to continue the special chair in forensic biology, a forensic expertise area of critical importance to the forensic science and education in Amsterdam. In 2019 the NFI and SILS initiated the procedure and selected a very strong NFI candidate for the position who is expected to be appointed in 2020. In addition, the CLHC supports a 2nd term for the special chairs in Forensic Medicine (prof dr Udo Reijnders) and Mathematics for Forensic Genetics (prof dr Klaas Slooten). In the CLHC ambition to expand the network, new opportunities for forensic chairs may emerge when new partners join the network or new collaborations are realized. Potentially interesting areas include non-human forensic biology (plant and animal traces) and forensic applications of AI (artificial intelligence).

PhD Theses

The main instrument for forensic scientific studies within the CLHC is the PhD project as this not only yields output in the form of scientific insights (as published in peer reviewed publications) and new methods for forensic case work but also leads to a new generation of experienced and talented scientists for the criminal

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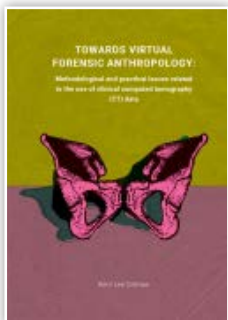
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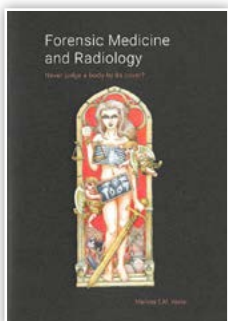
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justice system. CLHC professors, forensic experts and scientists within the institutes continuously explore options for obtaining funding to initiate new projects. Regularly, project proposals are submitted within national and international calls. In 2019, in total 3 PhD students successfully defended their forensic thesis :



- **Kerri Colman** – Towards virtual forensic anthropology : methodological and practical issues related to the use of clinical computed tomography (CT) data, Amsterdam UMC – November, 27th, 2019
– Promotores: prof Rick van Rijn, prof Roelof-Jan Oostra
– Copromotores : dr Lida van der Merwe, dr Hans de Boer



- **Marloes E.M. Vester** – Studies in Forensic and Post-mortem radiology, Never judge a body by its cover?, UvA, 29-10-19
– Promotores: Prof Dr R.R. van Rijn, Prof Dr W.L.J.M. Duijst



- **Kristiaan van der Gaag** – Development of forensic genomics research toolkits by the use of Massive Parallel Sequencing, LUMC, 27-11-2019
– Promotor: Prof Dr P. de Knijff (University Leiden)
– Co-promotor : Dr Titia Sijen

Since the start of the CLHC in 2013 in total 26 students obtained a PhD degree in forensic science.

Annual PhD symposium

In 2019 the 6th edition of the annual CLHC forensic PhD symposium was organized on the 25th of October at CWI Science Park. The theme for this edition was **'Crossing Borders'** in line with the AAFS 2020 theme chosen by its first foreign president in the history of this major annual forensic science conference, prof dr Zeno Geradts, NFI expert in digital forensics and professor by special appointment at the Informatics Institute of the Science Faculty of the UvA. To celebrate this unique occasion a special poster was made and the program included excellent speakers from abroad (King's College London) and from fields outside the traditional forensic areas (food safety analysis, doping, identification of missing persons and international and criminal law). The symposium was attended by nearly 200 FSM students, PhD students, scientists, forensic experts and partners from the criminal justice system. Participants were welcomed by prof Ton van Leeuwen (Amsterdam UMC) and dr Annemieke de Vries (NFI) on behalf of the CLHC board. Plenary presentations were given by Titia Sijen (NFI), Thomas Parsons (ICMP), Alan Brailsford (KCL), Yannick Weesepeel (WFSR), Karolien de Wael (UAntwerpen), Wouter Bosma (NFI), Rick van Rijn (AUMC/NFI) and Jill Coster van Voorhout (Law Faculty, UvA). During the lunch+poster session, a hands-on demo was provided by the University of Lausanne, the University of Antwerpen, Wageningen Food Safety Research, the Dutch Police and Dutch Customs on the use of portable, mobile technologies for chemical analysis. Portable analysis is of importance for the

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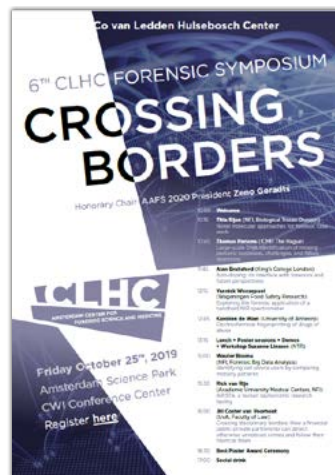
chemical identification of illicit drugs and explosives. A special workshop was given by Susanne Linssen from NTR/NPO on the communication of forensic science topics to a broad audience. A special episode of the popular TV show

'De Kennis van Nu' on illegal fireworks in the Netherlands was discussed. As in previous editions the Master Forensic Science student association Verum also presented their activities at the symposium.

A jury with members from the various partners in the criminal justice system selected the following winner for the 'Best Poster Award' of the 2019 CLHC Forensic PhD Symposium :

- **Shirin Alex** – Netherlands Forensic Institute/UvA:
Mass spectrometry-based proteomics for the identification of body fluids

Because of the special theme of this year, the winner was given the opportunity by the CLHC to attend the AAFS 2020 conference in February 2020 in Anaheim, California.



Poster announcement of the 2019 edition of the annual CLHC symposium

Various student teams presented their results from the master course **Advanced Forensic Biology** at the symposium. Another committee of CLHC contacts selected the 'Best Student Poster Award' of the 2019 CLHC Forensic PhD Symposium :

- **Heleen Coreelman, Yoram Goedhart, Simao Margarido and Loes Steller**
Genetically Variant Peptide Analysis of Burned Remains for Disaster Victim Identification

Impression of the CLHC annual symposium 2019



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EDUCATION



The CLHC actively supports the Master's in Forensic Science (MFS) program of the Institute for Interdisciplinary Studies (IIS). The coordinators of the program meet regularly with the CLHC Directors and take part in the CLHC coordinator meetings. The CLHC website is used by the students to find topics and contacts for literature theses and research projects (www.clhc.nl/education). These topics are provided by the institutional CLHC coordinators and the CLHC network. In the academic year 2018-2019 the literature thesis in the 2nd year of the Forensic Science master was fully coordinated by the CLHC (course coordinator: prof dr Arian van Asten). Additionally, the CLHC wants to ensure that forensic scientific talent is given maximum opportunity to continue their career in forensic science through PhD projects that emerge from the CLHC program.

PhD symposium

After the successful implementation of a FSM student poster event during the 2015 symposium, 2nd year students participating in the course **Advanced Forensic Biology** coordinated by SILS (Titia Sijen, Pernette Verschure, Ate Kloosterman) presented their forensic biological research proposals for the 4th time during the 2019 annual CLHC symposium.

Frontiers in Forensic Science sessions

Forensic Science students are strongly encouraged to attend the jointly organized Frontiers of Forensic Science (FFS) sessions. This academic lecture series is thereby part of the MFS program but open to scientists, forensic experts and all with a forensic interest. For each session a specific theme is selected for which established scientists, forensic practitioners and new scientific talent are invited to present their latest work.

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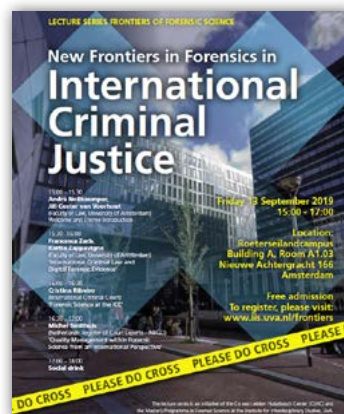
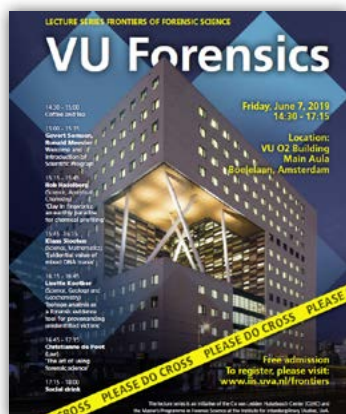
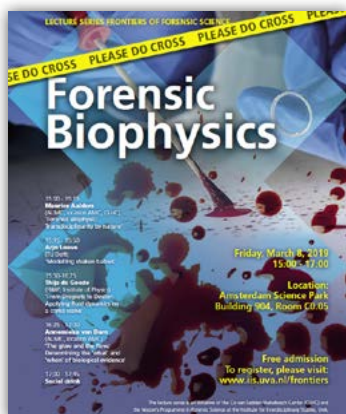
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Each academic year the CLHC financially supports invited lectures by renowned forensic scientists from abroad and the organization of one FFS session outside Science Park. The CLHC maintains an extensive contact list from the science, forensic and criminal justice communities and each FFS session is announced on the CLHC website, through an email to registered contacts and via several social media channels. For each session a special poster announcement is prepared and distributed. Consequently, attendance is high (100+) and diverse and this provides excellent opportunities for the students to meet forensic and scientific experts, police officers and legal professionals. In 2019 in total four sessions were organized (two in the academic year 2018-2019 and two in the academic year 2019-2020):

- **Forensic Biophysics** – March 8th, 2019 – Amsterdam UMC Location Meiburgdreef
 - Session Chair: Maurice Aalders (AUMC)
 - Speakers : Arjo Loeve (3mE Delft), Thijs de Goede (IoP, UvA), Annemieke van Dam (AUMC)

- **VU Forensics** – June 7th, 2019 – O2 building, VU Amsterdam
 - Session Chair: Govert Somsen, Ronald Meester (VU)
 - Speakers : Rob Haselberg, Klaas Slooten, Lisette Kootker, Christianne de Poot (VU)
- **New Frontiers in Forensics in International Criminal Justice** – September 13th, 2019 – UvA Law Faculty, Roeterseiland
 - Session Chair: Jill Coster van Voorhout (Law Faculty, UvA)
 - Speakers : Francesca Zarb, Kartia Zappavigna (UvA), Cristina Ribeiro (ICC), Michel Smithuis (NRGD)
- **Global Perspectives and New Developments in Forensic Anthropology** – November 27th, 2019 – Amsterdam Skills Centre, Amsterdam UMC
 - Session Chair: Kerri Colman (ASC, AUMC)
 - Speakers : Hans de Boer (NFI), Niels Lynnerup (University of Copenhagen, Denmark), Ericka L'Abbe (University of Pretoria, South Africa), Steven Symes (MSMEO, USA)



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The IIS master program in Forensic Science strongly relies on forensic expert input from the institutes and scientists linked to the CLHC. In the academic years 2018-2019 and 2019-2020 many CLHC associated teachers (often CLHC coordinators, scientists and

professors) were involved in the Forensic Master curriculum. Furthermore, in several courses guest contributions are provided by NFI experts giving the students insights in the role of forensic science in the criminal justice system and the practical considerations of forensic case work.

Institute	CLHC coordinator/scientist	Course in de Forensic Science Master	Contribution	Year
BMEPh - AUMC	Prof dr Maurice Aalders	Research and Innovation in Forensic Biophysics	Coordinator & Teacher	1
RAD - AUMC	Prof dr. Rick van Rijn	Physical and Forensic Anthropology	Guest lecture	1
AAA - AUMC	Prof dr. Roelof-Jan Oostra	Physical and Forensic Anthropology	Coordinator & Teacher	1
HIMS	Prof dr Arian van Asten	Literature Thesis	Coordinator	2
	Prof dr Arian van Asten	Research Project	Coordinator	2
	Prof dr Arian van Asten	Criminalistics and Analytical Chemistry	Guest lecture	1
	Prof dr Arian van Asten	Chemical Analysis for Forensic Evidence (CAFE)*	Coordinator & Teacher	2
IvI	Prof dr Zeno Geradts	Complex Crime Scenes	Teacher	1
KdVI	Prof dr Marjan Sjerps	Forensic Statistics and DNA Evidence	Teacher	1
	Dr. Bert van Es	Forensic Statistics and DNA Evidence	Coordinator & Teacher	
SILS	Dr Pernette Verschure	Advanced Forensic Biology	Teacher & Coordinator	2
	Prof dr Ate Kloosterman	Advanced Forensic Biology	Teacher	2
	Prof dr Ate Kloosterman	Forensic Statistics and DNA Evidence	Teacher	1
NFI	Drs Erwin Mattijssen	Observer Based Techniques	Coordinator & Teacher	2
	Drs Irene O'Sullivan	Complex Crime Scenes	Coordinator & Teacher	2
	Dr Titia Sijen	Advanced Forensic Biology	Teacher	2

MFS course coordination and contribution from CLHC coordinators and scientists in 2019

* The CAFE course is a specialization course for MFS students offered within the MSc Chemistry curriculum

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The mission of the IIS Master's programme in Forensic Science (MFS) is to train scientists with a broad forensic insight who can answer forensic questions from a sound basis in a scientific discipline, who can stimulate innovations in forensic science, and who can evaluate and strengthen the role of forensic evidence in the criminal justice system. For the MFS mission to succeed, forensic expert input from the institutes and scientists linked to the CLHC is very important. In the academic years 2018-2019 and 2019-2020 many CLHC associated teachers (often CLHC coordinators, scientists and professors) were involved in the MFS curriculum. Furthermore, in several courses guest contributions are provided by NFI experts giving the students insights in the role of forensic science in the criminal justice system

and the practical considerations of forensic case work. The collaboration of the CLHC and the MFS ensures the incorporation of recent scientific developments, cutting-edge research and forensic relevance into the master.

The CLHC institutes also play an important role in providing relevant and challenging topics for the literature thesis and research project assignments for the students during their 2nd year of the forensic science master. Of all literature theses and research projects 67% was supervised by CLHC partner institutes in 2019. In this framework the CLHC promotes student supervision by forensic experts and PhD students in the network while the CLHC coordinators and professors act as examiners. Finally, it should be noted that a substantial forensic education effort is also undertaken for Bachelor and Master students in other areas than forensic science. Frequently, students outside the MFS conduct forensic literature studies and research projects offered by the CLHC. Details can be found in the Institute Annex to this annual report.

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PR, COMMUNICATION AND INTERNATIONAL NETWORK



As there is a natural interest with the general public in the use of forensic science to solve crime, the activities within the CLHC can be used to get society involved and interested in science and the academic environment. As the CLHC represents and coordinates the forensic science efforts its partner institutes, the center is expected to create several outreach opportunities each year to promote science and interact with the society. This includes general forensic science presentations and workshops for a broad audience, illustrating forensic research projects in articles in newspapers and popular scientific magazines and contributions on the Internet and television. Also, in 2019 forensic research within the CLHC and associated CLHC featured in national media on several occasions. In the institute annex to the annual report all PR/Communication activities are listed including radio and TV interviews, press releases and popular scientific articles and presentations. The annex can be made available upon request.

Still from 'Kennis van Nu' episode on illegal fireworks in the Netherlands broadcasted in September 2019 on NPO1



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On June 15th, 2019 for the first time the CLHC directors organized a special 'Murder in the Lab' workshop for children in the age of 6-12. The workshop was part of the UvA family program of the 'Universiteitsdag UvA', organized at the Roeterseiland complex.



Which of the two CLHC directors committed a murder in the lab?

The CLHC website

An important communication platform for internal and external use is the CLHC website (www.clhc.nl). The CLHC web coordinator (Ineke Weijer) ensures that the site is a dynamic platform which provides the latest forensic scientific information both nationally and internationally. Information on the special chairs in forensic science, key publications and forensic PhD can be found in the 'Research' section. Historic documents on the work and life of Co van Ledden Hulsebosch are digitized and made available with the help of the grandson of the forensic pioneer. Students can use the website to find suitable projects and thesis subjects in the 'Education' area which is constantly updated with new projects and topics. The international partner page lists information of fellow academic centers in forensic science around the globe. In 2020 the CLHC website will be transformed to a new platform making it better accessible for smartphones, during this upgrade also the general information of the website will be updated. In 2019 the CLHC website was visited on average 50 times a day. The 'Co van Ledden Hulsebosch Center' Facebook page features news and events which reach on average 225 visitors per message. A 2019 highlight was the announcement of Forensic Biophysics frontiers session, which was read by 290 people.

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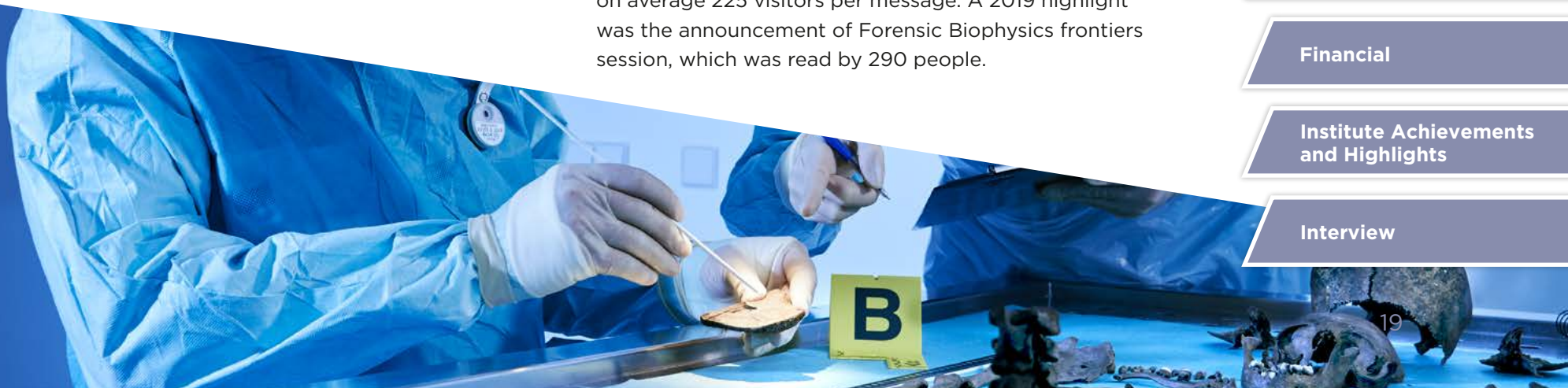
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FINANCIAL



The CLHC holds a limited budget for its activities. Every year all associated FNWI institutes, the NFI, the Amsterdam UMC and primary partner HvA provide a small financial contribution (1500 or 2500 euro) which add up to the annual CLHC budget of 26 keuro. The CLHC expenses are relatively small because of the virtual nature of the institute and minimal overhead involved. The CLHC does not fund research projects nor is directly responsible for such projects. This responsibility sits with the institutes and principal investigators. The CLHC means are used to create opportunities in terms of new collaborations, network meetings, symposia and outreach activities to increase general interest and awareness of the overall forensic science efforts in Amsterdam both nationally and internationally. The CLHC directors discuss progress and “return on investment” on a regular basis with the institute directors and the steering group.

In 2019 most expenses were associated with the annual symposium and the special theme for which additional

costs were made to create a special poster announcement, invite an international speaker and provide a special prize for the best poster award (11 keuro). Furthermore, the production of the annual report, the organization of FFS sessions and website support represent significant expenses (3-4 keuro each). Anticipated costs for the production of the 3-year evaluation report did not materialize as it was decided not to officially publish this document. Additionally, the costs associated with the production of the new CLHC folder to be presented at the AAFS conference will be covered in the 2020 budget. With a balance of almost 8 keuro at the beginning of the year and expenses in total of nearly 24 keuro, the CLHC budget at the end of 2019 was almost equal to the 2018 balance. All financial details are given in the financial annual report of the center in a separate annex that can be made available on request. The annual financial reports of the CLHC are discussed with and approved by the CLHC steering group.

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INSTITUTE ACHIEVEMENTS AND HIGHLIGHTS

In the institute annex all significant forensic achievements in 2019 are listed for every institute and the associated scientists. Highlights of 2019 obtained from these overviews are listed below. All achievements are collected in a separate annex of the CLHC Annual Report which can be made available upon request.

CLHC 2019 highlights from the Institute Annex:



- Annemieke van Dam and Maurice Aalders received an NWO Demonstrator funding for their project application **Second lift: a new tool to obtain valuable forensic information.**
- Arian van Asten obtained funding for a PhD project on the chemical profiling of chemical warfare agents (**FACING**) from the Innovation Fund of the Ministry of Defence in collaboration with TNO.
- A new PhD project was started at VU University entitled 'Normering van de opsporing in het digitale tijdperk' and supervised by **Lonneke Stevens, Marianne Hirsch Ballin, Christianne de Poot** and **Jasper van der Kemp.**



- Two PhD dissertations in the field of Forensic Radiology were successfully defended by **Marloes Vester** (*Studies in Forensic and Post-mortem radiology, Never judge a body by its cover?*) and **Kerri Colman** (*Towards virtual forensic anthropology: methodological and practical issues related to the use of clinical computed tomography (CT) data*).
- A paper by IOP scientists **Thijs de Goede, Karla de Bruin** and **Daniel Bonn** entitled 'High-velocity impact of solid objects on Non-Newtonian Fluids' was published in Nature Scientific Reports.

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- The results of the forensic citizen science experiment at the Lowlands Festival were published in Forensic Science International by **Anouk de Ronde, Marcel de Puit** and **Christianne de Poot** (*A study into fingerprints at activity level on pillowcases*).



- NFI forensic scientist **Titia Sijen** contributed to and redesigned the elective course **Advanced Forensic Biology** in the Forensic Science Master program.
- The successful Forensic Engineering MOOC entitled **Learning from Failures** was organized by Arjo Loeve, Michiel Schuurman and Karel Terwel from Delft Technical University.
- Student movie on Youtube on the **SherLOK** project coordinated by **Ben de Rooij** of Avans University of Applied Science in Breda (<https://www.youtube.com/watch?v=v26bCaHccwk>). This project on retrieving donor features in hair evidence combines forensic science with forensic education.



- On September 4th an episode of the popular science program 'De Kennis van Nu' ('Today's Knowledge') was broadcasted on Dutch national television featuring PhD student **Karlijn Bezemer** and **Arian van Asten** on the dangers associated with illegal firework trade.

- **Maurice Aalders** and **Arian van Asten** organized a special workshop for kids aged 6-12 in which they had to solve a 'Murder in the Lab' by conducting their own crime scene investigation to detect and secure the relevant forensic traces.
- CLHC forensic chemistry postdoc **Carlos Martin Alberca** was interviewed by a Spanish national radio station on his forensic research in the Netherlands.



- NFI expert and Informatics Institute professor by special appointment **Zeno Geradts** was officially elected as president for the 2020 meeting of the American Academy of Forensic Sciences (**AAFS**), the first ever foreign president in the history of this annual forensic science symposium in the USA.
- NFI expert and Korteweg-de Vries professor **Marjan Sjerps** is a member of the Technical Advisory Board of the Center for Statistics and Applications in Forensic Evidence (**CSAFE**) of Iowa State University, USA.
- NFI forensic scientist **Titia Sijen** organized a half day workshop at the ISFG conference in Prague on 'Body fluid identification through mRNA profiling or DNA methylation analysis'.

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Mini interview with CLHC Steering Group member and Science and Technology Director of the NFI, dr Annemieke de Vries.

Name	Annemieke de Vries
Position	Director Science and Technology
Institute	Netherlands Forensic Institute
Since	October 2018

What is your passion and ambition as the Director Science and Technology of the NFI?

“ My passion for science lies in coming across exciting discoveries and knowledge that can quickly be applied to practice, and as such make noticeable progress in socially relevant research fields. I like to be surprised and challenged, and remember as a PhD student in Utrecht impatiently cycling to the lab in the morning to see if my experiment worked out well and I could continue with the next research step. Even though nowadays I do not work in the lab anymore myself, I very much enjoy working with the highly motivated scientific researchers at NFI and other collaborating institutes. Motivated researchers with innovative

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research ideas inspire me and my work. When they also are keen to collaborate, preferably across disciplines, to advance forensic research and our institute, they can count on my support. My contribution lies in supporting them to seek, as well as actively creating opportunities so they can explore their ideas.

My ambition for NFI Research and Development is that our scientists experience an atmosphere that enables and encourages them to continuously monitor new developments in their forensic field and rewards 'out of the box' thinking and experimenting. For this, it is essential that they have access to sufficient time, budget and research tools. And this is where I come in: to ensure that the right conditions are properly managed. Forensic case work is evidently NFI's main task, however, R&D are crucial to keep our case work state of the art. We always have to think about how to address the forensic challenges of tomorrow, and anticipate timely."

What new developments in science and technology are going to be very important for the NFI in the future?

"I am convinced that we need to invest more in quick and easy to apply (hand-held) analysis tools; how can we carry out forensic analyses quicker and smarter, yet preserve quality standards as forensic research results need to be beyond any doubt. Our forensic partners want quick, guiding results so they can move forward with their investigation. We should approach forensic research in a sequential manner: indicative in-field results that can immediately be applied, typically followed by more in-depth analyses in a highly-controlled laboratory environment such as at NFI. New technologies like portable real-time devices for sequencing DNA and RNA, originating from the field of life sciences, are continuously improving and easier to use, likely also in forensic applications. I envision a future in which we have generic tools to real-time analyze a wide range of traces at the crime scene, irrespective of their biological, chemical or physical nature.

We should also invest in research into tools to strategically direct our case work, for example intelligently select traces before we analyze them in the lab. At NFI we have a goldmine of historical data,

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and if we apply Artificial Intelligence (AI) tools to analyze these, this could reveal best practices and preferred strategies for trace handling. In this context our first experiments with DNA traces are encouraging, and since AI knowledge and tools are developed very quickly, new possibilities for forensic research can and should be explored.

Finally, in addition to the more reactive forensic analyses, we should also increase our attention to early interventions, such as preventing criminal activity by disturbing network activities and preparations. This can be highly successful when based on solid science. In the Netherlands we have all the necessary expertise and knowledge to identify these threats early, and NFI wants to invest in joined scientific research in this area.”

How can the CLHC and its ambition contribute to the future research ambitions of NFI?

“The CLHC is an important and much appreciated network organization for NFI. The field of forensic research is relatively small and relevant research opportunities are sparse in my experience up to now. Hence, we should join efforts and collaborate to maximize progress. CLHC boosts this by bringing together the different forensic research areas, and stimulates collaboration and knowledge exchange by organizing symposia, meetings and get-togethers. With our jointly new initiatives such as setting up a national forensic research agenda with the entire field, the CLHC can strategically bring forensic research and researchers in the Netherlands together even more, and can also play a leading role in exploring funding opportunities. Broaden the CLHC to the national level can stimulate collaboration beyond those currently engaged, so NFI certainly supports this ambition.

For me personally, since forensic research was a new area, the CLHC has provided a soft landing to quickly become familiar with the field, organizations and researchers involved. Working with the CLHC board and steering group is constructive and energetic, giving a positive boost to the new research plans at NFI!



INTERVIEW

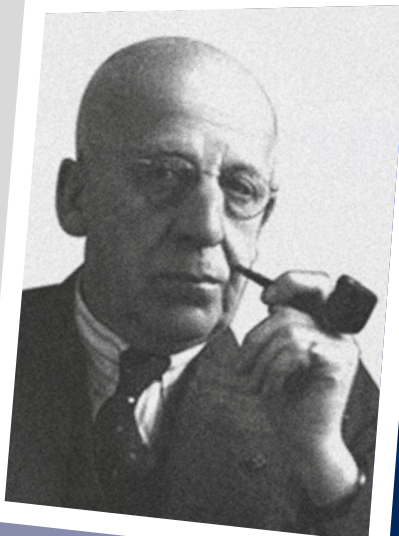
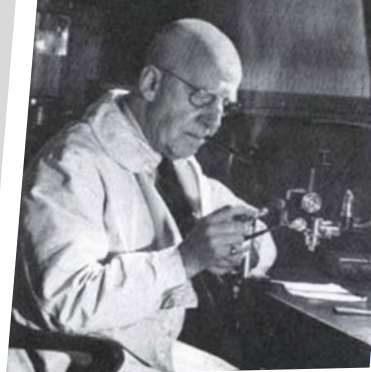
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Colophon

Co van Ledden Hulsebosch Center
Amsterdam Center for Forensic Science and Medicine

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