

OPTICS CENTENARY EVENT
(A Chronicle)



**IMPERIAL COLLEGE
LONDON**

8TH SEPTEMBER 2017

RECOLLECTIONS

Queens Tower, Imperial College

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1.0 PROLOGUE

On 8 September 2017, a centennial celebration was held by the Photonics Group, Department of Physics, Imperial College London. Imperial College's Department of Technical Optics was established in 1917 during World War I, when the UK lacked both advanced optical design capability and advanced optical instrumentation. As a result, the UK government established the first dedicated Department of Optics in a higher education institution (1917) to meet industry's training needs for optical designers. Appointed as first director of the department was



Tina Kidger

Professor Frederick Cheshire, a former official of the Patent Office who had carried out wartime service as Scientific and Technical Director of the Optical Department of the Ministry of Munitions. Alexander Conrady was subsequently appointed to the principal teaching post in the Department of Technical Optics, recognizing Conrady's significant contributions to the design of military optical equipment, particularly submarine periscopes, during World War I.

This centenary celebration was held to commemorate the 100 years of significant achievements of Imperial College's Department of Technical Optics and its subsequent organizations, down to today's Photonics Group within the Department of Physics. Although no formal record of this event was commissioned by the college to provide an event record for posterity, the centenary celebration was considered by some to be of such significance within the optical community, especially in view of IC's highly recognized contributions to optical science and technology, that this informal report has been prepared. This Chronicle has been prepared by Tina Kidger, Senior Member of OSA and SPIE, and spouse of the late IC optical design lecturer Michael Kidger. Tina wishes to express sincere appreciation to several of the sponsors who, responding to her specific support request, significantly helped to make this event possible. Michael Damzen, Head of the Photonics Group, provided his consent and expert review of this chronicle and its recollections of the centenary event highlights.

2.0 WELCOME



Professor Alice Gast

President and Rector of Imperial College London

It is with great pleasure that Imperial College London celebrates the 100th anniversary of the establishment of the Department of Technical Optics which has evolved into today's Photonics Group within the Department of Physics. As you will see during the events of today, our group of expert scientists and engineers has made very significant contributions during the last century to the development of optical science and technology allowing what was then unforeseeable advances in technology. Today we have in our everyday lives the achievements of optical lithography, medical instrumentation, optical communication... and basic science unachievable without the contributions of optics people. Optics is pervasive in everything we do and that with which we come into contact, indeed it is part of our complete conscious life. Please enjoy this look back at our optics history and then let's all go forward to carry on our great optical tradition.

3.0 ORGANISATION



Professor Michael Damzen
(Imperial College London)
Faculty of Natural Sciences
Department of Physics
Professor of Experimental Laser Physics
Head of the Photonics Group

I would like to extend my thanks to all who attended this special 100th Anniversary event, to our distinguished speakers and to all who helped with its organisation. My special thanks go to Judith Baylis who sorted out the registration, bookings, and catering for the reception and to Tina Kidger for helpful advice throughout my organising of this event. Thanks to all our very generous sponsors who made the event possible.

The 100th Anniversary was a very special, once in a lifetime, occasion. The Physics Department where we have celebrated previous anniversaries of Optics was not large enough to accommodate such a large event so the prestigious Great Hall at Imperial was chosen as the venue for the presentations and the Queens Tower Rooms for the evening reception. I am so pleased that we had a large turn-out of about 400 attendees and so many staff and alumni from many years past meeting again over drinks during the evening reception, along with dignitaries, senior representatives from societies, councils and industry.

We have celebrated the distinctive heritage of Optics at Imperial over previous decades and details of these can be found in the following links:

90th Optics Section Anniversary: <https://www.imperial.ac.uk/college.asp?P=1843>

80th Optics Section Anniversary:

http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/alumni/events/summary/event_3-8-2007-11-25-3?eventid=15514

60th Optics Section Anniversary:

<http://www.tandfonline.com/doi/pdf/10.1080/713819828>

4.0 COMPENDIUM OF OPTICAL ACHIEVEMENTS

100 Years of Optics at Imperial College (1917-2017)

"addressing training and research needs from applied Industry through to Fundamental Science for 100 Years"

100 Years of Training in Optics

- First dedicated Department of Optics in a higher education institution (1917), established by the UK Government to meet the training needs of optical designers for the optics industry.
- Technical Optics courses delivered (1917) and full undergraduate and postgraduate Optics degree courses by 1919, the first in the world. 100 Years of advanced postgraduate training in Optics for Industry and Academia — still ongoing in IC's existing MSc Optics and Photonics course, one of the few to still formally teach optical design using commercial software tools.
- Imperial College Optics Department played an influential role in meeting the national industrial training needs in optical design and instrumentation for its early period since World War 1. In latter decades training grew to meet expanding new optical and laser-based technologies.
- New recent (c. early 21st century) postgraduate Centre for Doctoral Training (CDT), training programmes in "Controlled Quantum Dynamics" and "Quantum System Engineering Skills" and MRes/PhD in Photonics (e.g. for biophotonics) addressing emergent new themes in Optics.

100 Years of Research in Optics

Optics activity at Imperial expanded into one of the world's largest and most diverse centres of optically-based fundamental science and applied technology by leading researchers in their field:

- **Optical Design and Optical Instrumentation:** e.g. Alexander Conrady; L C Martin; Harold H Hopkins; W D (David) Wright; Charles G Wynne; Walter T Welford
- **Diffraction, Holographic and Coherent Optics:** e.g. Robin Smith; J C (Chris) Dainty; Mark A A Neil
- **Laser and Nonlinear Optical Science and Technology:** e.g. Dan J Bradley; James R (Roy) Taylor; Geoff H C New; Henry Hutchinson; Wilson Sibbett; Paul M W French; Michael J Damzen
- **Spectroscopy:** e.g. William R S Garton; Lady Anne Thorne; Richard Learner; David Burgess; Richard Thompson; Keith Burnett
- **Biophotonics and advanced biological imaging:** e.g. Paul M W French; Christopher W Dunsby; James McGinty; Mark A A Neil; Peter Török
- **Fundamental Matter and Quantum Optics:** e.g. Peter Knight; Edward Hinds; Myungshik Kim
- **Attosecond and high-light-field science:** e.g. Jon Marangos; John Tisch; Peter Knight; Henry Hutchinson; Robin Smith
- More widely in Optics: John Pendry (Physics) pioneer of metamaterials and the concept of a perfect lens and invisibility cloak; Donal Bradley (Physics) revolutionised plastic electronics; and Dennis Gabor (Electrical Engineering) "father of Holography".
- And the vast number of past and present wonderfully gifted research students and researchers who have made amazing contributions, many who have gone on to stellar careers in optics and beyond.

5.0 THE CENTENARY EVENT

5.1 The Program

Optics Centenary Event

A celebration of 100 Years of Optics at Imperial

Venue: Great Hall, South Kensington Campus, Imperial College London

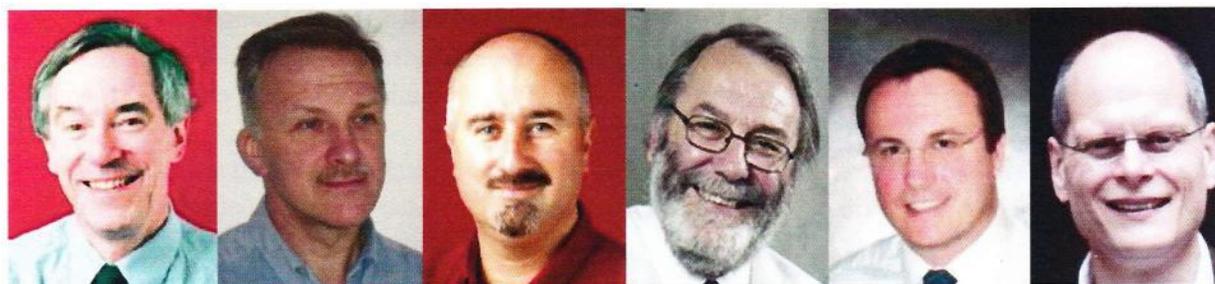
Date: 8th September 2017

<https://www.imperial.ac.uk/photonics/events/optics-centenary-event/>

Event Programme:

Time	Title	Speaker
13:50	Welcome Address	Prof Alice Gast <i>President of Imperial College London</i>
		Session Chair: Tina Kidger
14:00	100 Years of Optics at Imperial	Prof Chris Dainty
14:30	Heritage of Lasers at Imperial	Prof Roy Taylor, FRS
15:00	Applied Optics: Biophotonic Imaging	Prof Paul French
15:30	COFFEE BREAK in QTR	
		Session Chair: Prof Jon Marangos
16:15	Fundamental Optics: Quantum Science	Prof Sir Peter Knight, FRS
16:45	Industrial Optics: An industry perspective	Dr Chris Dorman
17:15	The Future of Optics	Prof Ian Walmsley, FRS
17:45	Closing Address	Dr Kenny Weir (<i>Head of Physics</i>)
17:50	RECEPTION in QTR*	
* Additional Displays and Demonstrations supporting Centenary Event will be located in Queen's Tower Rooms (QTR)		

Key-Note Event Speakers:



Prof Chris Dainty (UCL) Former Pilkington Professor at ICL, Head of Applied Optics and Postgraduate Alumnus. Past President of OSA	Prof Roy Taylor, FRS (ICL) Head of Femtosecond Optics, Photonics Group	Prof Paul French (ICL) Vice Dean of Research FoNS, former Head of Photonics Group, and Optics Alumnus of Imperial	Prof Sir Peter Knight, FRS (ICL) Former Head of Physics and Deputy Rector (Research). Past President of OSA	Dr Chris Dorman (Vice President of Coherent Scotland) Imperial Postgraduate Alumnus from Optics Section	Prof Ian Walmsley, FRS (Oxford) Imperial Physics Alumnus and current President-Elect of OSA
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*ICL., is Imperial College London; OSA is the Optical Society of America

100 Imperial College

5.2 Program Abstracts

As can be seen from the actual program given in section 5.1 above, the program was presented in two sessions of three papers each. Complete recordings are not available of each paper, however following are abstracts of the papers.

Session 1

Chair: Tina E Kidger

Proprietor
(Kidger Optics Associates, UK)

5.2.1 Professor Chris Dainty



Professor Chris Dainty

(University College London)
Professorial Research Associate
Institute of Ophthalmology
- Ocular Biology
Faculty of Brain Science

The Early Years and Classical Optics

Although there was talk of establishing a dedicated department of Optics in a university since the early 1900s, it was not until mid-1916 that the initiative was pushed hard by London County Council. They asked Imperial College to build a Department of Technical Optics, which would be overseen by a Technical Optics Committee, and, after some initial reticence, the College agreed in late 1916. The Technical Optics Committee consisted of representatives from Government (including defense) bodies, industry and the Royal Society. Their role was unusual, in that university departments were not usually run or monitored closely by outside bodies, and this Committee stayed in existence, albeit only in an advisory role since 1931, until 2006. This talk, traces the early history of Technical Optics from the appointment of the first staff in 1917. Through the eyes of the Technical Optics Committee: a full set of Minutes, 882 pages, exists in the Imperial College Archive

which has now been digitised. The focus in these early days was in optical design and engineering, and the names associated with Imperial over the years in these fields are legendary: Conrady, Martin, Kingslake, Wright, Hopkins, Welford, Wynne and Kidger. Classical optics still has huge commercial importance worldwide: indeed the total market for passive optics is far greater than that for all other optical components (lasers, LED's, etc) put together.

5.2.2 Professor Roy Taylor FRS



Professor Roy Taylor FRS

(Imperial College London)

Faculty of Natural

Sciences, Department of Physics

*Professor of Ultrafast Physics and
Technology*

Heritage of Lasers Physics Department Imperial College

This presentation will deal primarily with the development and characterisation of lasers in the Physics Department from 1973 with the arrival of Dan Bradley and his group from Belfast. Prior to that although some basic laser development had been carried out most systems were commercially based. The talk covers, the early days in the development of flash-lamp pumped dye lasers, their mode-locking and the role of the saturable absorber, development of e-beam excited excimer lasers and mode-locked semiconductor lasers, leading on to cw femtosecond dye lasers, real time femtosecond diagnostics through the synchroscan streak camera and the first femtosecond vibronic laser based upon Ti:sapphire. Highly applicable, diode-pumped vibronic lasers. Diverse applications of high power fibre lasers and master oscillator power fibre amplifiers for nonlinear optics in fibre including, supercontinuum sources, Raman fibre lasers covering the complete visible and near infra-red and high average power mid infra-red sources using fibre laser pumps reprise the research programme coverage to the present day.

5.2.3 Professor Paul French



Professor Paul French

(Imperial College London)
Faculty of Natural Sciences (FoNS)
Department of Physics
*Professor of Physics and
Vice Dean (Research) - FoNS*

Bio-photonics in the Optics Section

This talk reviews the development of the bio-photonics research activity in the Optics Section, which was strongly influenced by our development and application of ultrafast lasers. I outline their impact on fluorescence imaging, particularly with respect to nonlinear (multiphoton) microscopy and fluorescence lifetime imaging (FLIM), which we translated to clinical trials for the diagnosis of skin cancer. Ultrafast lasers also supported our work in super-resolved microscopy, for which we developed new Stimulated Emission Depletion (STED) microscopes. More recently this has been complemented by the development of low-cost approaches to single molecule localisation microscopy. We have also translated FLIM to in vivo endoscopy and are exploring other nonlinear imaging modalities including the use of Brillouin scattering.

Session 2

Chair: Professor Jon Marangos



Prof Jon Marangos

(Imperial College London)
Faculty of Natural Sciences
Department of Physics
Lockyer Chair in Physics

5.2.4 Professor Sir Peter Knight FRS



Professor Sir Peter Knight FRS

Blackett Laboratory,
Imperial College London
Kavli Royal Society International Centre,
Chicheley Hall, Chicheley, Buckinghamshire
Quantum Metrology Institute,
National Physical Laboratory

Fundamental Optics: Quantum Science at Imperial College

Imperial College has been at the forefront in the development of fundamental quantum optics for many years. I will describe in this talk some of the areas developed at Imperial and the people responsible for these.

Imperial College has pursued fundamental optical concepts and their applications for many years and I will describe some of these, through the personal lens of someone who has spent 40 years in the College working in this area.

Leading members of the Physics Department and in the wider college community have contributed massively to our understanding of light and its interaction with matter. Heroes such as G P Thomson, Denis Gabor, and Hanbury Brown were early pioneers of what became quantum optics. Experimental work on the nature of photons was pursued in the early days at Imperial by Leonard Mandel and Brian Morgan, amongst others. Tom Kibble contributed much to our understanding of laser light interactions with electrons (even while he was developing his much better-known work in field theory). In 1973, Geoff New was appointed to a faculty post and developed the theory group, with John Elgin and myself joining a little later. The group, originally the Laser Group within the optics section morphed into The Laser Optics and Spectroscopy Group and then into the Quantum Optics and Laser Science Group (QOLS).

Areas of focus within QOLS included Strong Field Physics (within the Laser Consortium), Ultra-fast phenomena, Cold atomic matter, Quantum Optics theory, and Quantum Information. My talk will describe some of the highlights achieved in each area over the past 40 years.

The 21st Century has seen the emergence of a networked world, connected by global fibre-optic communications and mobile phones, with geo-location provided through GPS, and all this has changed our lives more dramatically than at any time since the industrial revolution. Quantum-enabled technology is at the heart of this change. New developments in quantum technology, and in-particular miniature atomic clocks that utilize concepts such as coherent population trapping have the potential for even more dramatic applications. Some of these include communication systems immune to GPS jamming (of importance for global security), as well as quantum sensors for medical applications, sensitive magnetometry, gyroscopes, and geophysical surveying. I will describe the basic quantum phenomena being exploited as well as prospects for exploitation in current research underway in QOLS.

5.2.5 Chris Dorman

Chris Dorman

Coherent Scotland
Vice President and
General Manager



Work Hours per Lumen of Light, A Historical Perspective

A review of the history of the creation of light by humans since the invention of fire from the perspective of work hours per lumen of light generated. Bringing this up to date with the invention of the laser, and industrial applications of laser light. A review of the significant impact the laser has on modern manufacturing, with a focus on the modern smartphone.

5.2.6 Professor Ian Walmsley



Professor Ian Walmsley FRS

(University of Oxford)

Hooke Professor of Experimental Physics

Pro-Vice-Chancellor
(Research and Innovation)

The Future of Optics

Optics has provided either the basic phenomenology or the enabling technology for many of the major advances in physics over the past 400 years, from telescopes and interferometers that enabled new measurements of gravitational models to tests of local hidden variables and the aether that provided insight into the nature of quantum mechanics and electromagnetism.

The close connection between discovery and application using light means that new tools enabling new science evolve rapidly. That's as much the case now as it has been in the past: optics remains a vibrant enterprise, reaching across many different fields. Advances in our ability to use light to control, manipulate and measure objects will enable us to reach new frontiers in science, from the ultra-small, to the ultra-cold, to the ultra-complex, resulting in new applications from tests of fundamental constants to radically different means of communication and Information processing.

5.3 Closing Address



Dr Kenny Weir

(Imperial College London)
Acting Head, Department of Physics

Faculty of Natural Sciences
Department of Physics

IC's Centenary, Leading to the Future

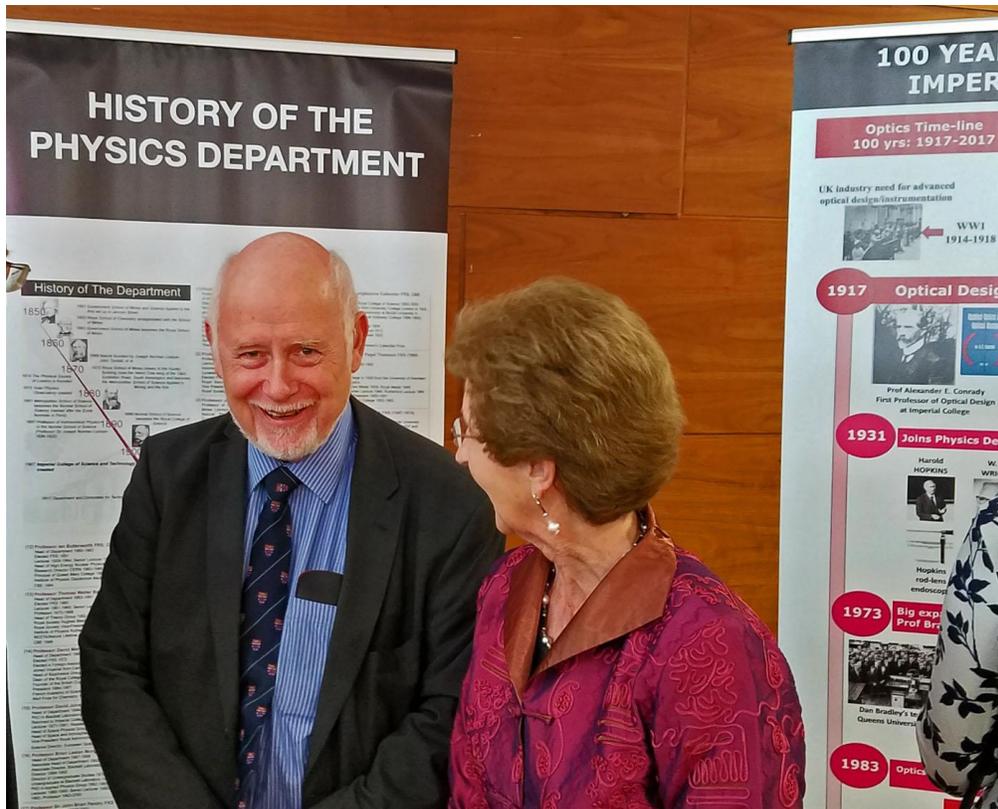
Many thanks for the contributions of today's speakers, sponsors and the people involved in organising and co-ordinating this centenary event. It is of tremendous value for everyone, including specialists and those even peripherally associated with the optical discipline, to pause and look back at the history of our chosen field of endeavour. It is only through such reflection that we can more fully absorb, appreciate and understand how optical science and technology has developed into what it is today. This past century's work here at Imperial College, including the work of our predecessors in fundamental science, optics and associated applications, has laid the foundation supporting much of today's research.

Optics is an enabling and interdisciplinary subject that, at Imperial, has seen successful collaboration between groups within the Department of Physics, while simultaneously reaching out into other departments across the college, other research institutes and industry. By maintaining and strengthening our work in these activities, Imperial College Optics will continue to significantly impact science, technology and medicine for many years to come.

6.0 Attendee/Sponsor Remarks

6.1 Attendees:

6.1.1 Kelvin Hopkins, M.P. for Luton North



Kelvin Hopkins (son of H.H. Hopkins) with Tina Kidger (session chair)

“Many thanks for enabling me to attend the Imperial College event, which I thought went extremely well. Imperial has clearly been a world-renowned centre for optical science for a century and remains so today. The presentations by the distinguished scientists at the celebration were impressive and obviously at the cutting edge of modern science and most appropriate to the occasion.”

6.1.2 David E. L. Freeman



Msc, DIC Optical Design and Engineering Consultant

Imperial College's Optics Centenary Event was an extremely enjoyable occasion. The papers gave an interesting review of the Optics research work at IC past and present. As a classical optical designer, I particularly enjoyed Chris Dainty's paper and his evidence that classical optics is alive and well and still accounting for the lion's share of the optics market.

The Event was an opportunity to meet old friends and colleagues and share experiences of the IC Applied Optics Section. As students, we were so fortunate to have access to world-renowned academics who had a significant impact on our professional lives.

6.2 SPONSORS:



6.2.1 Sponsor:



6 December 2017

Professor Michael Damzen
Head of Photonics Group
Imperial College London

Dear Prof. Damzen,

Congratulations on celebrating 100 Years of Optics at Imperial College London from your friends and colleagues at OSA, The Optical Society. The Optics Centenary Event on 8 September 2017 featured a programme of distinguished speakers, who embodied the outstanding legacy and impact of optics and lasers at Imperial College London. The Optics Centenary Event, of which OSA was a proud sponsor, was an exceptional celebration as it both honored the history of optics at Imperial and explored how advances in optical sciences will address global challenges in the future.

As the oldest institution of higher education and research in optics in the world, the Photon Science Section, formerly known as the Optics Section, has secured a distinguished position in the history of optics. Originally founded in 1917 to teach technical optics, the optics community at Imperial College London has grown to become a prestigious, world-renowned program in the field of optics and its industrial and scientific applications. The applied and fundamental research conducted by the Section and the novel technologies developed by current and future students will have a lasting impact on advances in optical science.

The optics community at the Imperial College London has been an invaluable and dedicated partner with OSA over the years. A number of faculty and graduates of the Imperial College of London have served in key leadership roles for OSA and have shaped the future of the Society and the community, most notably OSA 2004 President Prof Sir Peter Knight, OSA 2011 President Prof Chris Dainty, and OSA 2018 President Prof Ian Walmsley.

OSA recognizes the staff leadership and dedication of the Photon Science Section within the Imperial College London. The Imperial College London will continue to build on its history of developing exciting results in our field, long into the future. Congratulations once again on this milestone.

Sincerely,

A handwritten signature in black ink that reads 'Eric Mazur'.

Eric Mazur
2017 OSA President
Professor
Harvard University

A handwritten signature in black ink that reads 'Elizabeth A. Rogan'.

Elizabeth Rogan
Chief Executive Officer
OSA, The Optical Society

6.2.2 Sponsor:



SPIE leaders congratulate Imperial College London on optics centenary

SPIE Newsroom
08 September 2017

SPIE leaders on Friday joined in congratulating Imperial College London (ICL) on its 100th anniversary of optics research and education.

SPIE Past President [Emery Moore](#), SPIE Fellow [Chris Dainty](#), SPIE Senior Member [Tina Kidger](#), and SPIE CEO **Eugene Arthurs** attended the optics centenary event, which included lectures, demonstrations, and displays of Imperial College's long history of vibrant optics-based research and its world impact on the science of light. SPIE was a cosponsor of the event.



Alice Gast (above, center), Imperial College London president, welcomed about 400 celebrants to a full day of lectures by distinguished optical scientists. Imperial College's

Photon Science Section is the largest university optics center in the UK, with research activities covering everything from applied optical systems to quantum optics.

ICL's optics program was established as the Department of Technical Optics in 1917 to address the shortage of optical engineers needed during the Industrial Revolution. **A.E. Conrady**, an eminent optical designer for whom an SPIE annual award is named, taught the first courses in optical design.

In 1931, the department name was changed to the Technical Optics Section and the optics program continued to grow over the years, adding laser, photonics, applied optics, and other research groups over the years. It was recently renamed the Photon Science Section.

In addition to the A.E. Conrady Award, SPIE has two other annual awards named after individuals who worked and/or studied at Imperial, the **Dennis Gabor** Award and the **Rudolf Kingslake** Medal and Prize. Kingslake's wife, Hilda, was Conrady's daughter. **Hilda Kingslake** was, herself, another accomplished optical designer and graduate of Imperial College.

Tina Kidger, owner of Kidger Optics Associates and the author of a 2016 SPIE Proceedings paper, "[The optical legacy of Imperial College London](#)," introduced the first three speakers. Members of the SPIE Student Chapter at ICL distributed complimentary copies of Kidger's paper to attendees.

Michael Kidger, for whom an SPIE annual scholarship award is named, taught some the first courses in optical design at Imperial College.

In 1931, the department name was changed to the Technical Optics Section and the optics program continued to grow over the years, adding laser, photonics, applied optics, and other research groups over the years. It was recently renamed the Photon Science Section.

6.2.3 Sponsor:

Synopsys



George Bayz

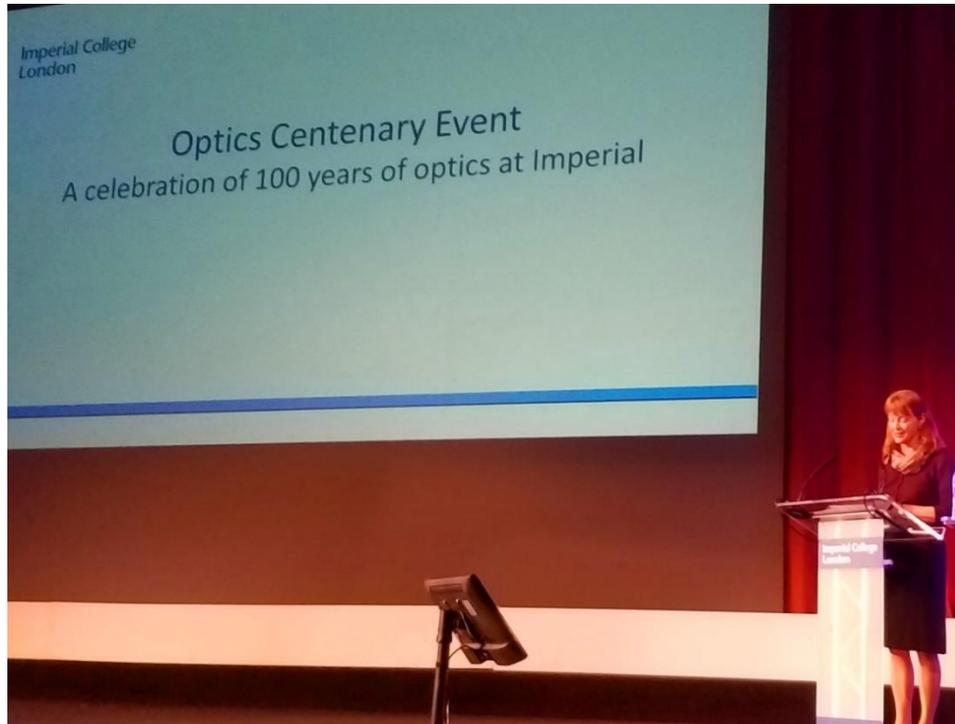
Vice President

Synopsys' Optical Solutions Group, USA

It was an honor for Synopsys to participate in celebrating 100 years of optics education at Imperial College London. The College has a unique history as the world's oldest institute of optics and it continues to be dedicated to excellence in optics education and research.

7.0 Appendices

7.1 Centenary Event Photos



Welcome – Alice Gast, President, Imperial College London



Reception: Tina Kidger and Mike Damzen (Event Organizer)

100 YEARS of OPTICS at IMPERIAL COLLEGE

Optics Time-line 100 yrs: 1917-2017

UK industry need for advanced optical design/instrumentation



WW1
1914-1918

Imperial College Time-line

Royal School of Mines

Royal School of Chemistry

Royal College of Science

Imperial College
formed

1851

1907

1917 Optical Design Department formed



Prof Alexander E. Conrady
First Professor of Optical Design
at Imperial College



- First Dedicated Optics Department in the World
- First Technical Courses in Optics in 1917
- First UG and PG Courses in 1919

Other Notable Early Optics Members

- L.C. Martin
- B.K. Johnson
- Rudolf Kingslake
- Hilda Conrady

1931 Joins Physics Dept as (Technical) Optics Section

Harold HOPKINS



Hopkins rod-lens endoscope

W. D. WRIGHT



Colour vision

Charles WYNNE



Computer-aided optical design

Walter WELFORD



Non-imaging optics

Robin SMITH



Holographic techniques



Denis Gabor

1973 Big expansion of Prof Bradley and world-leading Laser team



Dan Bradley's team from
Queens University Belfast

Professor
Dan Bradley



Roy Taylor



Geoff New



Henry Hutchinson



Wilson Sibbett



Eugene Arthurs

1983 Optics Section = Applied Optics and Laser Optics Groups (Spectroscopy Group joins in 1988)

Applied
Optics
Group



Chris Dainty



Sir Peter Knight

Laser Optics
&
Spectroscopy
Group



John Pendry

2001 Optics Section = Photonics & QOLS Groups



Paul French



Richard Thompson



Jon Marangos



Donal Bradley

2015 Optics re-titled Photon Science Section



Mike Damzen



Myungshik Kim



Donal Bradley

2017

Optics
1917-2017
100 years of applied science

100 Imperial College
Years of Optics 1917-2017 London

Imperial College
London 100

Banner 1

OPTICS SECTION PERSONNEL (1917-2017)

1917	1920 - 1939	1940 - 1959	1960 - 1979	1980 - 1999	2000-2017
			Prof F W CHESHIRE 1917-1928 1 st Director of Optics Dept		
			Prof A E CONRADY 1917-1931 1 st Professor of Optical Design		
			Prof L C MARTIN 1917-1951		
			Mr B K JOHNSON 1920-1963		
			Prof A POLLARD 1919-1925		
			Prof W D WRIGHT 1925-1973		
			Prof H H HOPKINS 1947-1967		
			Prof W WELFORD 1947-1983		
			Prof C G WYNNE 1960-1978		
			Mrs P WORMELL 1962-2000		
			Dr K RUDDOCK 1961-1977		
			Dr A THETFORD 1963-1969		
			Dr M KIDGER 1963-1987		
			Prof R W SMITH 1967-2012		
			Dr R EDGAR 1968-1970		
			Dr M BARNETT 1969-1992		
			Dr D FOSTER 1970-1975		
			Mr F REAVELL 1971-2004		
			Prof D BRADLEY 1973-1981		
			Prof G NEW 1973-2013		
			Prof H HUTCHINSON 1973-1997		
			Prof W SIBBETT 1973-1985		
			Prof ROY TAYLOR FRS 1973-present		
			Dr J VUKUSIC 1973-1992		
			Dr E MUNRO 1979-1994		
			Prof Sir P KNIGHT FRS 1980-present		
			Prof C DAINTY 1983-2002		
			Dr T CANAS 1983-2000		
			Prof M DAMZEN 1984-present		
			Prof R SYMMS 1986-89		
			Prof R THOMPSON 1986-present		
			Mr J MAXWELL 1987-2001		
			Prof P FRENCH 1989-present		
			Prof J MARANGOS 1990-present		
			Dr I E-SANZ 1992-1995		
			Prof D SEGAL 1993-2015		
			Dr K WEIR 1994-present		
			Prof R SMITH 1998-present		
			Prof J TISCH 1998-present		
			Prof M PLENIO 2000-2009		
			Prof V VEDRAL 2000-2004		
			Prof M NEIL 2002-present		
			Prof P TOROK 2002-present		
			Prof E HINDS FRS 2002-present		
			Prof B SAUER 2002-present		
			Dr C PATERSON 2002-present		
			Prof T RUDOLPH 2003-present		
			Dr S SCHEEL 2004-2013		
			Dr S POPOV 2005-present		
			Prof L FRAZINSKI 2007-present		
			Prof M IVANOV 2008-present		
			Prof M KIM 2009-present		
			Prof M TARBUTT 2009-present		
			Dr J MCGINTY 2011-present		
			Dr V AVERBUKH 2011-present		
			Dr C DUNSBY 2012-present		
			Dr F MINTERT 2013-present		
			Dr S KOLTHAMMER 2017		
			Dr M VANNER 2017		
SPECTROSCOPY JOIN OPTICS SECTION 1988					
			Prof Lady A THORNE 1955-1993		
			Prof D BURGESS 1962-2000		
			Dr R LEARNER 1963-2000		
			Dr R SPEER 196x -1998		
			Prof Sir K BURNETT 1984-87		

**100 Imperial College
London**

Banner 2

PHOTONICS GROUP (PHOT)

Mission Statement of PHOTONICS Group:

"To conduct research into science underlying optical techniques & develop novel photonics technologies for real-world applications"

PHOTONICS FOR LIFE

HEALTHCARE

BIOMEDICAL



CANCER

HEART DISEASE

3-D, IN-VIVO

OPT

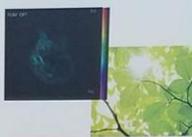
OCT

BRILLOUIN MICROSCOPY

ENDOSCOPY IMPLEMENTATION

LIFE SCIENCES

BIOPHOTONICS



LIFE PROCESSES

AGRI-TECH

FLUORESCENCE LIFETIME IMAGING

SUPER-RESOLUTION MICROSCOPY



DRUG DISCOVERY



HIGH CONTENT ANALYSIS

STED

PALM

STORM

FRET

PHOTONICS ENABLING OUR MODERN WORLD

COMMUNICATION



SOURCES

FIBRE LASERS

SOLID-STATE LASERS

SUPER-CONTINUUM LASERS

DIODE LASER SOURCES

LED SOURCES



SENSING



TECHNIQUES

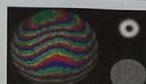
FIBRE NONLINEAR OPTICS

NONLINEAR OPTICS

ADAPTIVE OPTICS

PROGRAMMABLE LIGHT (e.g. SLM)

MICROPOLARIMETRY



MANUFACTURING



MATERIALS

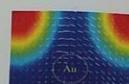
2-D MATERIALS

GRAPHENE

PHOTONIC STRUCTURES

CHIRAL OPTICS

PLASMONICS



Banner 3

WOMEN IN OPTICS AT IMPERIAL COLLEGE



Hilda Conrady was a member of the very first full-time degree class in the new Optics Department at Imperial College. After graduating in 1923, she continued at Imperial as a researcher publishing on topics including the Foucault knife-edge test and spherical aberrations. In 1928, she moved with her husband Rudolf Kingslake (also an Optics Department graduate) to the Institute of Optics, Rochester, USA, making a lifelong career in optics. Hilda received major awards and commendations from many civic and professional societies, including the Fellowship of the Optical Society of America.

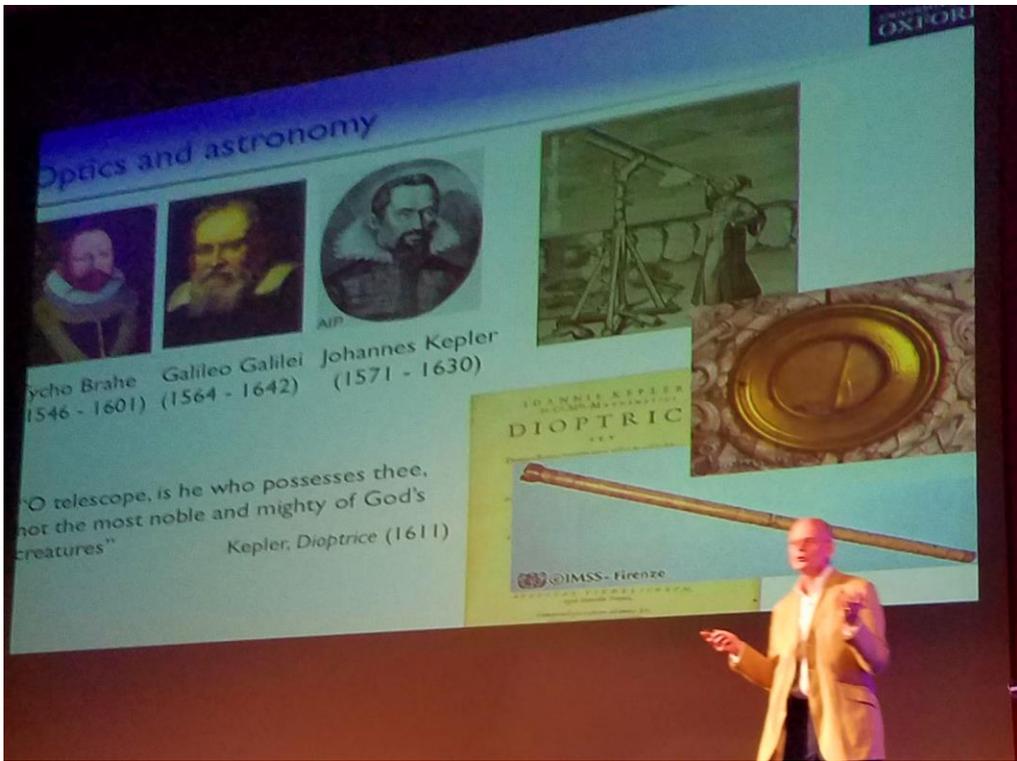
Hilda was eldest daughter to Prof Conrady, the first Professor of Optical Design at Imperial in 1917. She died two days before her 101st birthday in 2003, followed by her husband Rudolf Kingslake just 13 days later aged 99.

Prudence Wormell, was a Research Officer in the Optics Section from 1962 – 2000, and subsequently an Honorary Research Fellow. With a background as a mathematician who came from the budding computer industry, she joined the Optical Design Group led by Prof Charles Wynne. Her work provided computational programming and developed computational tools for the design of optical systems. Freeing optical designers from the tedious hand-calculations, these computer methods brought lens design into the modern era.

She was Honorary Secretary to the Optical Group of the Institute of Physics (UK). She played an important role in the organisation of the Optics Reading Room, a cherished and long-standing resource for the Optics Section.



Lady Anne Thorne, was at Imperial College from 1955 – 1993 and subsequently Senior Research Fellow in the Optics Section in Physics. Her research centred on the spectroscopy of atoms and diatomic molecules and experimental methods included Fourier Transform Spectroscopy for atmospheric and astrophysical applications. Her seminal book "Spectrophysics" published in 1974, and subsequently rewritten as "Spectrophysics: Principles and Applications" in collaboration with U. Litzten and S. Johansson in 1999. She was also active in pastoral care in the College, serving 20 years as the First Senior Tutor for Women Students and took a leading part in starting the Imperial College Day Nursery.



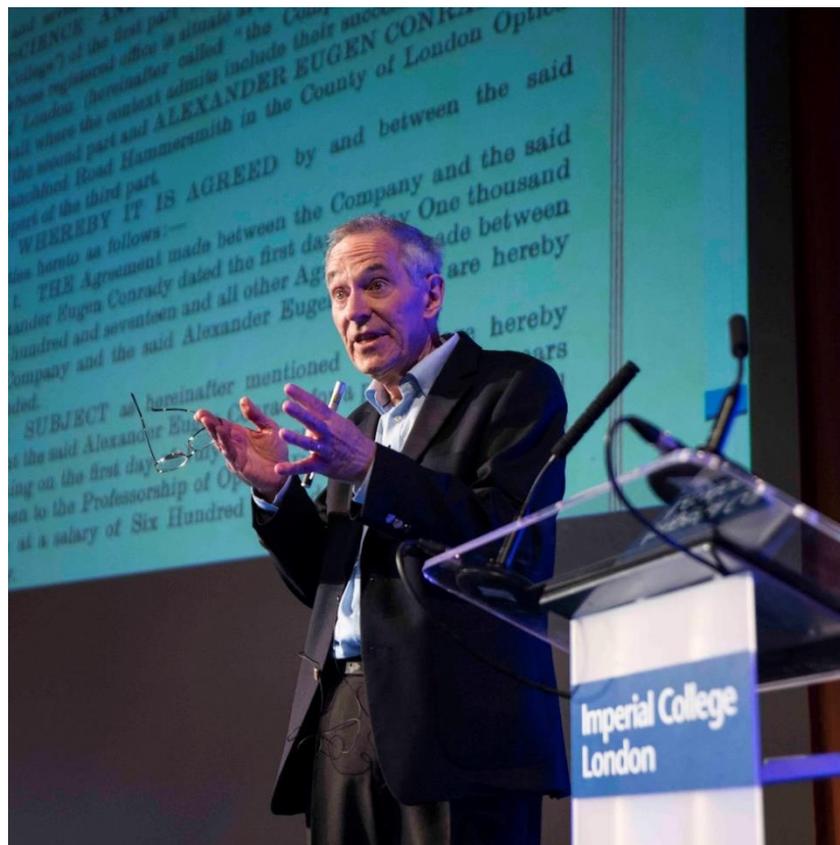
Session 2: Professor Ian Walmsley



Reception: Facing are - Roy Taylor, Paul French and Eugene Arthurs



Reception: Jon Maxwell and Gareth Jones



Session 1: Professor Chris Dainty



Introducing Session 1: Tina Kidger



Session 1: Professor Paul French



Reception: MSc Optics and Photonics students



Reception: Professor Jon Marangos and Dr Emma Springate (STFC)



Reception: Professor Peter Torok (red shirt, at table) and Dr Gabrielle Thomas



Reception: Dr Vicente Aboites (CIO, Mexico) and Dr Robbie Murray



Reception: Dr Mark Richards and Professor Myungshik Kim



Reception: Professor Martin McCall (orange top)

7.2 End of a Perfect Day



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