

Curriculum vitae

Ivo Vellekoop



Full name	Ivo Micha Vellekoop
Date of birth	November 11th, 1977
Place of birth	The Hague, The Netherlands
Address	Enschede, The Netherlands
Marital status	Cohabiting
e-mail	i.m.vellekoop@alumnus.utwente.nl
Website	www.ivovellekoop.nl

Work experience

- 1/2010 - 4/2010 **Invited visiting post-doctoral scholar, California Institute of Technology, Changhui Yang Research Group.**
- Developing digital optical phase conjugation methods and applications.
- 9/2008 - 11/2009 **Post-doctoral researcher, Imaging through turbid media**
University of Zurich, Physical Systems Biology, Dr. C. M. Aegerter
- Setting up new research group and laboratory for biophysics imaging (group started September 2008).
 - Part of the interdisciplinary Swiss initiative in systems biology (SystemsX).
 - Collaboration with experimental and theoretical biologists, computer scientists, micro-engineers and physicists.
- 7/2008 **Research scientist, University of Twente**
- Wrote award winning article for Physical Review Letters.
- 12/2003-4/2008 **PhD student, Directing light through non-transparent objects**
University of Twente, MESA+ Institute for Nanotechnology, Complex Photonic Systems, Foundation for fundamental research on matter (FOM)
- Experimental and theoretical work in optics and statistical physics.
 - Thesis supervisors: Prof. Dr. Ad Lagendijk and Dr. Allard P. Mosk.
 - World's first demonstration of focusing light through opaque objects.
 - Design, simulation and construction of complex optical experiments.
 - Design and implementation of a programming framework for distributed instrument control, parallel data processing, and learning algorithms.
 - Supervision of two Master students (resulted in two peer-reviewed publications).
 - Intensive collaboration with approximately thirty PhD students and post-doctorates working on related projects.
- 1997 - 2003 **Various, including:**
- Freelance design work (posters, logos, CD covers, videos).
 - Teaching assistant at the University of Twente, courses and practicums.

Education

- 2003-2008 **PhD Physics, University of Twente, Enschede.**
- 1996-2003 **MSc Electrical Engineering, cum laude, University of Twente**
- Master thesis: Time Resolved Measurements on Diffusion of Light (grade: 10 out of 10).
 - Major: Microsystems and Microelectronics.
 - Minor: Art, technology and media at the AKI art academy.
- 1989-1996 **Gymnasium (i. e. grammar school), Cals College, Nieuwegein**
- Subjects: Dutch, English, Latin, History, Mathematics A, Mathematics B, Physics, Chemistry, Biology (average grade: 9 out of 10).

Grants and awards

- 2009 **Overijssel PhD award, best PhD thesis of the University of Twente.**
- 2009 **Research grant of the University of Zurich**
- Salary and material budget for research project: in-vivo imaging in turbid media.
- 2009 **1st prize in PhD thesis contest of the Dutch Physics Magazine**
- 2008 **Listed in the top 10 physics stories of the year 2008**
- International ranking as determined by the American Institute of Physics.
- 2008 **Awarded 'editor's suggestion' by Physical Review Letters.**
- 2008 **1st prize in poster contest, MESA+ conference, the Netherlands.**
- 2004 **1st prize in poster contest, Waves in Complex Media Workshop, the Netherlands.**
- 2003 **Graduated cum laude, MSc Electrical Engineering, University of Twente**
- Highest graduation honor in the Dutch system.
- 2001 **Socrates Erasmus grant**
- Three months research internship at the KTH University in Stockholm, Sweden.
 - Subject: Spontaneous parametric down-conversion of light for applications in quantum computing (experiments and theory).

Other activities

- 2004-2007 **Founder and member of the board, dramatic society 'Kip'.**
- 2003 **Member of the board, student group for modern dance 'Arabesque'.**
- 2001 **Vice-chair (full-time appointment), Cultural umbrella organization 'Apollo'**
- Promoted interest of 20 cultural student organizations.
- 1999 **Secretary, Student drama group 'Nest'**
- Organized four theatre productions and managed an association with 50 members.

Skills

- Computer **Programming:** C++, C#, Basic, Assembler (x86, MMX), Python, various scripts.
Technologies: ActiveX, Direct 3D, .NET, multithreading, distributed computing.
Technical: Matlab, Maple, Mathematica, LabView, NI-DAQmx.
Graphical: 3D Rendering, Photoshop, Illustrator, CorelDraw and more.
- Language **Dutch:** mother tongue. **English:** fluent, written and spoken.
German: advanced reading and conversation. **Spanish:** basic, spoken.
- Courses **Nijenrode University:** Business Orientation Programme.
Other: Goal-oriented planning, information retrieval.
- Other Driving license
- Hobbies Swimming, running, making computer art, travelling, theatre.

List of publications

Peer-reviewed publications

- 2010 I. M. Vellekoop and C. M. Aegerter, '*Scattered light fluorescence microscopy: imaging through turbid layers*', *Optics Letters* 35, 1245-1247. **Selected for the Virtual Journal of Biomedical Optics.**
- 2010 McDowell, E.J. and Cui, M. and Vellekoop, I.M. and Senekerimyan, V. and Yaqoob, Z. and Yang, C, '*Turbidity suppression from the ballistic to the diffusive regime in biological tissues using optical phase conjugation*', *Journal of Biomedical Optics* 15, 025004.
- 2010 I. M. Vellekoop and A. Lagendijk and A. P. Mosk, '*Exploiting disorder for perfect focusing*', *Nature Photonics* 4, 320-322.
- 2008 I. M. Vellekoop and A. P. Mosk, '*Universal Optimal Transmission of Light Through Disordered Materials*', *Physical Review Letters* 101, 120601. **Marked 'editor's suggestion' by Physical Review Letters.**
- 2008 I. M. Vellekoop and A. P. Mosk, '*Phase control algorithms for focusing light through turbid media*', *Optics Communications* 281, 3071-3080.
- 2008 E. G. van Putten, I. M. Vellekoop, A. P. Mosk, '*Spatial amplitude and phase modulation using commercial twisted nematic LCDs*', *Applied Optics* 47, 2076-2081.
- 2008 W. H. Peeters, I. M. Vellekoop, A. P. Mosk and A. Lagendijk, '*Wavelength dependence of light diffusion in strongly scattering macroporous Gallium Phosphide*', *Physical Review A* 77, 035803. **Selected for the Virtual Journal of Ultrafast Science.**
- 2008 I. M. Vellekoop, E. G van Putten, A. Lagendijk and A. P. Mosk, '*Demixing light paths inside disordered metamaterials*', *Optics Express* 16, 67-80. **Selected for the Virtual Journal of Biomedical Optics.**
- 2007 I. M. Vellekoop and A. P. Mosk, '*Focusing coherent light through opaque strongly scattering media*', *Optics Letters* 31, 2309-2311. **Selected for the Virtual Journal of Biomedical Optics.**
- 2004 I. M. Vellekoop, P. Lodahl and A. Lagendijk, '*Determination of the diffusion constant using phase-sensitive measurements*', *Physical Review E* 71, 056604.

Publications in popular magazines

- 2009 **[invited]** I. M. Vellekoop, '*Orde in de flipperkast*', *Natuurwetenschap & Techniek*, July-August (Dutch popular science magazine).
- 2009 I. M. Vellekoop, '*Gemanipuleerd licht schijnt dwars door ondoorzichtige materialen*', *Nederlands Tijdschrift voor Natuurkunde (Dutch Physics Magazine)*, 75(3), **1st prize in contest for articles describing PhD research.**
- 2007 **[invited]** I. M. Vellekoop, '*Anti-verstrooiing*', *Fotonica Magazine*, December (invited review for Dutch photonics community).

Invited oral presentations

- 2010 Mark Schnitzer Group, Stanford University, Stanford.
- 2009 Physics@FOM (Conference of the Foundation for Fundamental Research on Matter), Veldhoven, The Netherlands, '*Universal optimal transmission of light*'.
- 2008 Harvard Medical School, Wellman Center for Photomedicine, Boston, '*Controlled random scattering of light*'.
- 2008 ETH Zurich, '*Controlled random scattering of light*'.
- 2008 AMOLF institute for Atomic and Molecular Physics, Amsterdam, '*Opaque lenses, leading light through a maze*'.
- 2007 Conference of the MESA+ institute for nanotechnology, '*Focusing coherent light through strongly scattering nanophotonic materials*'.

Posters and presentations (primary contributions only)

- 2010 I. M. Vellekoop and C. M. Aegerter, '*Focusing light through living tissue*', SPIE Photonics West, Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIV.
- 2008 Oral presentation, Universitair Medisch Centrum Groningen, '*Focusing light through non-transparent objects: from discovery to application*'.
- 2008 Oral presentation, Physikalisch-Technische Bundesanstalt (PTB), Berlin, '*Opaque Lenses, controlling light propagation in disordered materials*'.
- 2008 Oral presentation, University of Freiburg, Germany, '*Opaque Lenses, controlling light propagation in disordered materials*'.
- 2007 Oral presentation, Physics@FOM (Conference of the Foundation for Fundamental Research on Matter), Veldhoven, The Netherlands, '*Inverse diffusion of light in non-transparent objects*'.
- 2006 Poster presentation, Optical Society of America 1st conference on Metamaterials, Grand Bahama Island, I. M. Vellekoop and A. P. Mosk, '*Perfect transparency in opaque materials*'.
- 2005 Oral presentation, Workshop of the Center for Nanophotonics (Amsterdam), '*Anderson localization*'.
- 2005 Poster presentation, Cargese Summer school 'Imaging of Complex Media with acoustic and seismic waves', Cargese, Corsica, I. M. Vellekoop and A. P. Mosk, '*Open channels in opaque optical systems*'.
- 2004 Poster presentation, Waves in Complex Media workshop, Enschede, I. M. Vellekoop, P. Lodahl and A. Lagendijk, '*Ultrafast measurements on diffusion of light*', **1st prize in poster contest**.
- 2003 Poster presentation, Physics@FOM (Conference of the Foundation for Fundamental Research on Matter), Veldhoven, The Netherlands, I. M. Vellekoop, P. Lodahl and A. Lagendijk, '*Ultrafast measurements on diffusion of light*'.

Other publications

- 2010 I. M. Vellekoop and C. M. Aegerter, '*Focusing light through living tissue*', Proceedings of SPIE, Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIV, 755430.
- 2008 I. M. Vellekoop, '*Controlling the propagation of light in disordered scattering media*', PhD thesis, University of Twente, Enschede, The Netherlands. Available at: cops.tnw.utwente.nl/output/3_theses.html.
- 2006 I. M. Vellekoop and A. P. Mosk, '*Focusing of light by random scattering*', ArXiv cond-mat/0604253. Available at: arxiv.org.
- 2003 I. M. Vellekoop, '*Time resolved measurements on diffusion of light*', Master thesis, University of Twente, Enschede, The Netherlands. Available at: cops.tnw.utwente.nl/output/3_theses.html.
- 2003 D. Ljunggren, P. Marsden, M. Tengner, I. Ghiu, I. Vellekoop and A. Karlsson, '*Efficient single-mode generation of degenerate 1550 nm entanglement in type-II parametric downconversion*', Conference contribution QTuB, CLEO/QELS, Baltimore.
- 2002 I. M. Vellekoop, '*Type-II downconversion in a BBO crystal: Optimizing SPDC emission for fiber coupling*', internal report, Royal Institute of Technology, IMIT, Kista, Sweden.

Press coverage

National and regional newspapers

May 30, 2009	Twentsche Courant Tubantia, ' <i>Kijken door het ondoorzichtige</i> '.
February 7, 2009	NRC Handelsblad, ' <i>Kijken door kipfilet</i> '.
August 23, 2008	Volkscrant, ' <i>Twentenaren sturen licht door dicht verflaagje</i> '.
August 13, 2008	Twentsche Courant Tubantia, ' <i>UT jaagt speciaal licht door melk</i> '.
July 14, 2007	NRC Handelsblad, ' <i>Witte verf of eierschaal als brandglas voor bundel laserlicht</i> '.
June 2, 2007	NRC Handelsblad, ' <i>Nieuw Licht</i> '.

Scientific journals and magazines

May 6, 2010	Nature 465, 12, ' <i>See through tissue</i> '.
October 1, 2009	Nature Medicine 15, 1106, ' <i>The most transparent research</i> '.
December 22, 2008	Physics News Update 879.1, ' <i>Top Ten Physics Stories of the Year</i> '.
September 2008	Physics 1, 20, J. B. Pendry, ' <i>Light finds a way through the maze</i> '.
February 2008	Nature Physics 4, 91, ' <i>Scattered Focus</i> '.
August 8, 2008	Science Now, M. Schirber, ' <i>Threading Light Through the Opaque</i> '.
October 2007	Photonics Spectra p. 90, ' <i>Turning opaque materials into lenses</i> '.
October 2007	Optics & laser Europe p. 16, ' <i>Opaque materials let light through</i> '.
October 2007	Physics Today p. 26, ' <i>Physics Update</i> '.
November 2007	Discover Magazine p. 21, ' <i>By Fish or Photon</i> '.
August 21, 2007	New Scientist p. 24, ' <i>Human tooth and eggshell can focus light</i> '.
August 15, 2007	PhysicsWorld, ' <i>Opaque lens focuses light</i> '.
August 3, 2007	Physics News Update 835.1, ' <i>Opaque lens</i> '.

National technical journals

July 28, 2007	Technisch Weekblad p.5, ' <i>Twentse microscoop kijkt in melktanden, papier en eierschalen</i> '.
September 2007	De Ingenieur p.17, ' <i>Fasedraaier maakt lens van wit papier</i> '.
July 26, 2007	Metaal magazine, ' <i>Gedresseerde laser straalt door ondoorzichtige materialen</i> '.

New media and electronic magazines

February 18, 2010	Noorderlicht.vpro.nl (Dutch popular science site) ' <i>Nederlandse natuurkundigen omzeilen optische beperkingen met dun verstrooiend laagje</i> '.
February 9, 2009	NU.nl (Dutch news website) ' <i>Twentse lichttechniek geeft beter inzicht in tumoren</i> '.
August 20, 2008	PhotonicsOnline.com, ' <i>Light finds a way, even through white paint</i> '.
August 18, 2008	Physorg.com, ' <i>Physicists Transmit Light through Opaque Materials</i> '.
August 7, 2008	PhysicsToday.org, ' <i>Opacity to transparency</i> '.
September 19, 2007	CERN Courier, ' <i>Seeing through an opaque lens</i> '.
August 23, 2007	Complexity Digest 2007.32, www.comdig.com.
August 15, 2007	Optics.org, ' <i>Opaque material lets light through</i> '.
July 11, 2007	Kennislink.nl, ' <i>Laser kijkt dwars door papier</i> '.
2007	Korean Institute of Science and Technology Information, Global trend update. radar.ndsl.kr (in Korean).



University of Twente
Enschede - The Netherlands

*The Doctorate Board of the University of Twente
under the authority given it by the law admits*

IVO MICHA VELLEKOOP

born in 's-Gravenhage, the Netherlands, on November 11th, 1977

to the degree of Doctor (Dr.),
(pursuant to "de Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek"
(the law on Higher Education and Scientific Research), articles 7.18 and 7.22)

having heard the defence on April 24th, 2008 of the thesis

entitled:

**CONTROLLING THE PROPAGATION OF LIGHT IN DISORDERED
SCATTERING MEDIA**

Chairman of the Doctorate Board,

prof.dr. W.H.M. Zijm

Enschede, April, 2008



UNIVERSITY OF TWENTE

UNIVERSITY FOR TECHNICAL AND SOCIAL SCIENCES

THIS IS TO CERTIFY THAT

IVO M. VELLEKOOP

BORN, 'S-GRAVENHAGE, NOVEMBER 11, 1977

HAS COMPLETED THE FINAL EXAMINATION OF THE FACULTY OF

ELECTRICAL ENGINEERING

IN ACCORDANCE WITH ARTICLE 7.10 PARAGRAPH 2 OF THE LAW ON HIGHER EDUCATION AND
SCIENTIFIC RESEARCH AND AS SPECIFIED IN ARTICLE 7.20 PARAGRAPH 1 UNDER A. OF THE
AFOREMENTIONED LAW HAS THEREFORE EARNED THE ACADEMIC TITLE OF

INGENIEUR (IR.)

EQUIVALENT TO THE TITLE

MASTER OF SCIENCE (M.Sc)

WITH CREDIT

ENSCHEDA, NOVEMBER 28, 2003

DEAN OF THE FACULTY

A handwritten signature in black ink, appearing to be 'J. J.', written over the printed text 'DEAN OF THE FACULTY'.