UNIVERSITÉ LIBRE DE BRUXELLES

Prof. Frank Dubois

Curriculum Vitae

Short CV

Professor Frank Dubois obtained his PhD in 1992 at the Department of Optics and Acoustics of the ULB. In 2002, he became a member of the academic staff of ULB. In October 2022 he obtained the title of honorary professor. The developments of his PhD were devoted to automatic pattern recognition methods combining optical and digital techniques. He joined the Microgravity Research Centre (ULB) in 1996 to develop instruments for microgravity and space applications. In this laboratory, he developed numerous instruments for the space shuttle, sounding rockets and parabolic flight campaigns. The development of optical instruments led him to invent new optical concepts in digital holographic microscopy protected by several patents and valorized by the spin-off OVIZIO. He was a pioneer in this technology both in terms of instrumentation and applications. Important achievements with this technology were the 4 PromISS experiments implemented in the International Space Station and the numerous sounding rocket experiments to study the behaviour of blood in microgravity. Since October 2022, he joined the BEAMS MECHATRONICS department where one of his activities is dedicated to the development of digital holographic microscopy for blood platelet analysis with several partners in a European project. The project aims at providing a more efficient instrument than the usual ones for clinical applications.

Honorary professor since October 2022
Full professor since 2015 until 2022
Professor since 2010 until 2015
Assistant professor since 2005 until 2010
Chef de travaux since 2002 until 2005
ULB scientific researcher since 1998 until 2002
Scientific researcher since 1985 until 1998

Education

Courses

Introduction à la miscroscopie optique (3 credits, MA1 - Biomedical) – until academic year 2022-2023
Instrumentation for process technology (4 credits, MA1 - CM) – until academic year 2021-2022
Non-destructive testing of materials (3 credits, MA2 - CM) – until academic year 2021-2022

Management responsibilities

Vice-president of the Chemistry and Material Science department (2007-2009, 2016-20)
President of the Chemistry and Material Science department since 2009 until 2016
Chairman of the master thesis jury CM since 2012 until 2021
Member of the Pluridisciplinary commission since 2009 until 2013
Director of the Microgravity Research Centre Department since 2007 until October 2022

Scientific profile

Citations (Google Scholar): **5750**
h-index (Google): **33**

Five main publications

- Buongiorno, J., Iorio, C. S., **Dubois, F.**, Van Vaerenbergh, S. (2009). A benchmark study on the

thermal conductivity of nanofluids. *Journal of applied physics*, *106*(9), 094312. – **1304 citations**
- Dubois, F., Joannes, L., & Legros, J. C. (1999, December). Improved three-dimensional imaging with a digital holography microscope with a source of partial spatial coherence. *Applied optics*, *38*(34), 7085-7094. – **416 citations**
-Dubois, F., Schockaert, C., Callens, N., & Yourassowsky, C. (2006, June). Focus plane detection criteria in digital holography microscopy by amplitude analysis. *Optics express*, *14*(13), 61-74. – **422 citations**
- Dubois, F., Requena, M.-L. N., Minetti, C., Monnom, O., & Istasse, E. (2004, February). Partial spatial coherence effects in digital holographic microscopy with a laser source. *Applied optics*, *43*(5), 1131-1139. – **208 citations**
- Dubois, F., Yourassowsky, C., Monnom, O., Legros, J. C., Debeir, O., Van Ham, P., Kiss, R., & Decaestecker, C. (2006). Digital holographic microscopy for the three-dimensional dynamic analysis of in vitro cancer cell migration. *Journal of biomedical optics*, *11*(5), 054032. doi:10.1117/1.2357174 – **197 citations**

Other scientific output and impact (only mention most relevant)

Granted research projects (Reduced list)

DSC MAP ESA project – 1999-2002
MICADO Walloon Region project – 2001-2003
CAPA Walloon Region project – 2001-2003
Link project “Conception et réalisation d’un nouveau type de microscope ayant une profondeur d’investigation étendue” of the “Région Bruxelles Capitale” 2000-2002
Link project “Conception et Développement d’un tomographe optique permettant la mesure à trois dimensions de gradients d’indice de réfraction dans les fluides” of the “Région Bruxelles Capitale” - 2002-2003
DCCO 2 (Diffusion Coefficients in Crude Oils) experiment 2002
PromISS 1-4 experiments (Protein Microscope for the International Space Station), ESA et PRODEX - 2002 à 2005
DECISIV (Waleo 2 – Walloon Region), 2006-2008
Dynamics of cells and biomimetic systems (BIOMICS), ESA and PRODEX de 2006 à 2021
« HoloFlow » Project IRSIB, Impulse 2008 – 2008-2014
ESA project « Infrared digital Holography », 2009
BioWin Project « BioLine » 2014-2017
HoloCancer, BioWin Walloon Region, 2015-2018
“Dust holography”, Innoviris project 2019
Participation to Skywin Lawitecs project 2020-2023
EUROSTAR 3DPLTS project since June 2022

Published books

- **Dubois, F.**, Yourassowsky, C., Boudjeltia, K. Z., & Dohet-Eraly, J. (2022). *Holography - Recent Advances and Applications: Digital Holographic Microscopy in Partially Coherent Illumination and Applications*. IntechOpen
- El Mallahi, A., Minetti, C., & **Dubois, F.** (2015). *New techniques in Digital Holography: Automation of digital holographic detection procedures for life sciences applications*. Wiley.
- Dubois, F., El Mallahi, A., Minetti, C., & Yourassowsky, C. (2014). *Multi-dimensional imaging: Advanced digital holographic microscopy for live sciences applications*. Wiley.
- Dubois, F., Yourassowsky, C., & Monnom, O. (2004). *Microscopie en holographie digitale avec une source partiellement cohérente*.

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Awards

Enterprize.be first prize 2010 for the OVIZIO Spin-Off that we created in 2009, Nominated Zénobe price in 2011, OVIZIO: Deloite Most Disrupive Innovator 2012, OVIZIO: Nominated ITM Awards 2012 Best patented Innovation

Valorization experience and industrial collaboration

Industrial collaboration with

OVIZIO (spin-off of MRC), Lambda-X (spin-off of MRC), EUROMULTITEL

Patents

List: WO2014037575 A1, EP10190977, EP 08165820, EP 09172561, US7463366 B2, US7362449B2, EP1399730Bl, US7009700B2, US6535276B2

Example: EP3286734B1, "ANALYSIS METHOD OF BLOOD PLATELETS AGGREGATE" 24.06.2020. Use of digital holography microscopy to analyze platelet aggregates in 3D.

Spinoff companies and technology licensing

OVIZIO, licensing digital holographic microscope technologies

In the frame of the EUROSTAR 3DPLTS project, it is foreseen to valorise a new instrument to analyse the platelet aggregates to achieve an innovative medical diagnostic device.

Societal services

Reviewer for several scientific journals, Evaluations of projects for national agencies and in other universities