
Curriculum Vitae Prof. Dr. Joseph Heitman



Photo: Duke University

Name: Joseph Heitman

Born: 17 March 1962

Research Priorities: Microbiology, pathogenesis, infectious diseases, fungal genetics and genomics, sexual reproduction, host-pathogen interaction

Joseph Heitman is professor of molecular genetics and microbiology. He is recognized for his fundamental contributions to microbial genetics of eukaryotes – living organisms with a cell nucleus. In yeast, he discovered target structures and mechanisms of action for widely used drugs with anti-proliferative and immunosuppressive effects. The work of his research group on pathogenic fungi provides information on infection mechanisms, drug action and resistance, and sexual reproduction and is important for transplantation and infection medicine.

Academic and Professional Career

- since 2019 Co-Director and Fellow, Canadian Institute for Advanced Research (CIFAR) program „Fungal Kingdom: Threats & Opportunities“, Toronto, Canada
- since 2012 Director, Tri-Institutional Molecular Mycology and Pathogenesis Training Program, Duke University, Durham, USA
- since 2009 Chair, Department of Molecular Genetics and Microbiology, Duke University, Durham, USA
- since 2004 James B. Duke Professor, Duke University Medical Center, Durham, USA
- 2002 - 2009 Director, Duke University Program in Genetics and Genomics (UPGG), Durham, USA
- 2002 - 2014 Director, Duke University Medical Center, Durham, USA
- 2002 - 2004 Professor, Duke University Medical Center, Durham, USA
- 2005 Investigator, Howard Hughes Medical Institute, Chevy Chase, USA
- 1998 - 2005 Associate Investigator, Howard Hughes Medical Institute, Chevy Chase, USA

- 1998 - 2002 Associate Professor, Departments of Genetics, Pharmacology and Cancer Biology, Microbiology, and Medicine, Duke University Medical Center, Durham, USA
- since 1998 Instructor in residence, Woods Hole Molecular Mycology Course, Center for Host-Microbial Interactions, Duke University School of Medicine, Durham, USA
- 1992 - 1998 Assistant Professor, Duke University Medical Center, Durham, USA
- 1992 - 1998 Assistant Investigator, Howard Hughes Medical Institute, Chevy Chase, USA
- 1991 - 1992 Fellow, National Institutes of Health (NIH) Medical Scientist Training Program, The Rockefeller University and Cornell University Medical College, New York, USA
- 1992 MD, Cornell University Medical College, New York, USA
- 1989 - 1991 Postdoctoral Fellow, European Molecular Biology Organization (EMBO), Biocenter, University of Basel, Basel, Switzerland
- 1989 PhD, The Rockefeller University, New York, USA
- 1984 - 1989 Fellow, National Institutes of Health (NIH) Medical Scientist Training Program, The Rockefeller University and Cornell University Medical College, New York, USA
- 1984 Master in Biochemistry, University of Chicago, Chicago, USA
Bachelor of Science in Chemistry with General and Special Honors, University of Chicago, USA
- 1980 - 1984 Studies of Chemistry and Biochemistry, University of Chicago, Chicago, USA

Functions in Scientific Societies and Committees

- 2018 - 2019 Member, Metzenberg Award Committee, The Neurospora Policy Committee Pacific Coast, USA
- 2017 - 2019 Member, Genetics Society of America Conferences Committee, Rockville, USA
- 2017 - 2019 Chair, Fungal Genetics Policy Committee, Fungal Genetics Stock Center, USA
- 2015 - 2020 Member, Editorial committee, Annual Review of Microbiology, San Mateo, USA
- 2014 - 2019 Visiting Professor, Ruhr-Universität Bochum, Germany
- 2014 Member, Scientific advisory committees for the 9th international Cryptococcus meetings, Amsterdam, Netherlands
- 2013 - 2019 Member, Fungal Genetics Policy Committee, Fungal Genetics Stock Center, USA
- since 2013 Board of Editors, mBio, American Academy of Microbiology, USA
- 2013 Member, International Scientific Committee, Comparative Genomics of Eukaryotic Microorganisms, Sant Feliu de Guixols, Spain
- 2012 - 2016 Member, Karling Lecture Committee, Mycological Society of America (MSA), USA

Nationale Akademie der Wissenschaften Leopoldina

www.leopoldina.org

since 2012 Associate Editor, (Public Library of Science) PLoS Genetics, San Francisco, USA

2012 Member, International Scientific Advisory Board, ISHAM-Conference (The International Society for Human and Animal Mycology), Berlin, Germany

2011 - 2019 Chair, Faculty Honors Committee, Duke University School of Medicine, Durham, USA

2011 - 2018 Member, Advisory Committee for the CIFAR Program „Integrated Microbial Biodiversity“, Toronto, Canada

2011 Member, International Scientific Committee, Comparative Genomics of Eukaryotic Microorganisms, Sant Feliu de Guixols, Spain

2011 Member, Scientific Advisory Committees, 8th International Cryptococcus Meetings, Charleston, USA

2010 - 2017 Member, Committee, American Academy of Microbiology, USA

2009 - 2011 Member, Annual Meeting Program Committee, Infectious Diseases Society of America, USA

2009 - 2010 Chair, Chancellor’s Science Advisory Council, Duke University Medical Center, Durham, USA

2009 Member, International Scientific Advisory Board, ISHAM-Conference, Tokyo, Japan

2009 Member, International Scientific Committee, 27th ISSY Symposium on Yeasts, Paris, France

2009 Member, International Scientific Committee, Comparative Genomics of Eukaryotic Microorganisms, Sant Feliu de Guixols, Spain

2008 - 2011 Section editor, PLoS Pathogens, San Francisco, USA

2008 - 2010 Intel Science Fair Judge, American Academy of Microbiology, USA

2008 Member, Scientific Advisory Committees, 7th International Cryptococcus Meetings, Nagasaki, Japan

2007 - 2010 Councilor East, Medical Mycological Society of the Americas (MMSA), USA

2007 - 2009 Branch Lecturer, American Society for Microbiology (ASM), USA

since 2006 Member, Editorial Board, PLoS Biology and Current Biology and Cell Host & Microbe, Cambridge, USA

2006 Member, International Scientific Advisory Board, ISHAM-Conference, Paris, France

2005 - 2008 Member, Awards Committee, Infectious Diseases Society of America, USA

2005, 2007 Member, International Scientific Advisory Board „Advanced Lecture Course on Human Fungal Pathogens“, Federation of European Biochemical Societies (FEBS), La Colle-sur-Loup, France

2009, 2011

- 2005 Member, Scientific Advisory Committees, 6th International Cryptococcus Meetings, Boston, USA
- 2002 - 2003 Member, International Scientific Advisory Committee, XXI. International Conference on Yeast Genetics, Gothenburg, Sweden
- 1995 - 1996 Chair, Seminar Committee, Duke University Program in Genetics and Genomics, Durham, USA
- 1992 - 1996 Member, Seminar Committee, Duke University Program in Genetics and Genomics, Durham, USA

Project Coordination, Membership in Collaborative Research Projects

- 2020 - 2021 Principal Investigator, „Structural biological development of fungal-specific calcineurin inhibitors“, NIH (Nation Institute of Health)/NIAID (National Institute of Allergy and Infectious Diseases), Bethesda, USA
- 2015 - 2020 Principal Investigator, „Transdisciplinary program to identify novel antifungal targets and inhibitors“, NIH/NIAID, Bethesda, USA
- 2019 - 2025 Co-Director, Program „Fungal Kingdom: Threats and Opportunities“, CIFAR - Canadian Institute for Advanced Research, Toronto, Canada

Honours and Awarded Memberships

- 2021 Member, National Academy of Sciences, USA
- 2021 Distinguished Mycologist Award, Mycological Society of America, Madison, USA
- 2021 Member, German National Academy of Sciences Leopoldina, Germany
- 2020 Member, American Academy of Arts and Sciences, USA
- 2019 ASM Award for Basic Research, American Society for Microbiology, USA
- 2019 Edward Novitski Prize, Genetics Society of America, USA
- 2018 Faculty of 1000 Faculty Member of the Year Award, London, UK
- 2018 Rhoda Benham Award, Medical Mycological Society of the Americas, New Orleans, USA
- 2018 Dean’s Award for Excellence in Mentoring, Graduate School, Duke University, Durham, USA
- 2018 Stanley J. Korsmeyer Award, American Society for Clinical Investigation, USA
- 2017 Faculty of 1000 Outstanding Faculty Member of the Year Award, London, UK
- 2015 Faculty of 1000 Faculty Member of the Year Award, London, UK

2014	Faculty of 1000 Outstanding Faculty Member of the Year Award, London, UK
2014	Member, Alpha Omega Alpha (AOA) Medical Honorific Society, Morgantown, USA
2013	Faculty of 1000 Faculty Member of the Year Award, London, UK
2012	Translational Research Mentoring Award, Duke University, Durham, USA
2011 - 2021	NIH/NIAID MERIT Award, Bethesda, USA
2011	Faculty of 1000 Faculty Member of the Year Award, London, UK
2007	Presidential Meritorious Service Award in Executive Leadership, Duke University, Durham, USA
2006	Member, Association of American Physicians (AAP), USA
2004	Member, American Association for the Advancement of Science (AAAS), USA
2004	Member, American Academy of Microbiology, USA
2003	Squibb Award, Infectious Diseases Society of America (IDSA), USA
2003	Member, IDSA, USA
2003	Member, American Society for Clinical Investigation (ASCI), USA
2002	ASBMB Award, American Society for Biochemistry and Molecular Biology, USA
1998 - 2005	Burroughs Wellcome Fund Scholar in Molecular Pathogenic Mycology, Durham, USA
1991	Gustavo Cudkowicz Memorial Prize in Immunobiology, Cornell University Medical College, New York, USA
1989 - 1991	EMBO Long Term Fellow
1988	Outstanding Graduate Student Research Award, American Society for Microbiology, USA

Research Priorities

Joseph Heitman is professor of molecular genetics and microbiology. He is recognized for his fundamental contributions to microbial genetics of eukaryotes – living organisms with a cell nucleus. In yeast, he discovered target structures and mechanisms of action for widely used drugs with anti-proliferative and immunosuppressive effects. The work of his research group on pathogenic fungi provides information on infection mechanisms, drug action and resistance, and sexual reproduction and is important for transplantation and infection medicine.

Pioneering studies from the Heitman lab using Baker's yeast revealed how immunosuppressive natural products interrupt signaling cascades via a family of proteins called FKBP12-drug complexes. Heitman gained early recognition with the discovery of the protein kinase TOR, a

special enzyme that influences signal transmission in cells. This enzyme can be inhibited by the immunosuppressive drug rapamycin and thereby, for example, rejection reactions in transplantation medicine can be prevented. In addition, rapamycin affects cell division initiated by TOR, and is therefore employed in cancer chemotherapy as well.

Joseph Heitman discovered unisexual reproduction in pathogenic fungi, which has implications for microbial evolution. With genetic and genomic approaches, Heitman's team elucidated molecular principles of fungal virulence and identified therapeutic targets. Studies defined the enzyme calcineurin as a virulence factor in fungi and serve to investigate further proteins such as the FK506 analogues as novel antimicrobial therapeutics. As part of his research, Joseph Heitman is analyzing the role of RNA interference (RNAi) in microbial pathogens, including hypervirulent outbreak lineages and drug resistance through epimutation, a transient change in gene activity.