



# Peter M.A. Slood

Professor of Complex Adaptive Systems

Founding Scientific Director [Institute for Advanced Study](#)

University of Amsterdam, Amsterdam, NL.

**Web-Site and Email:** [www.peter-slood.com](http://www.peter-slood.com), [p.m.a.slood@uva.nl](mailto:p.m.a.slood@uva.nl)

**Contact:** +31651564723;

**Current Position:** Full professor at the University of Amsterdam

## Academic Leadership and Mentoring

- (co-)Director of the [complexity Institute](#) in NTU Singapore since its inauguration in 2014 till end 2020.
- Founding scientific director of the [Institute for Advanced Study in Amsterdam](#)
- Lead of the [Advanced Computing Lab in St. Petersburg](#), Russian Federation from 2014 - 2020 .
- Editor in Chief of two Elsevier Science Journals: [Future Generation Computing Science](#) (FGCS), with the highest impact factor in this field: 5.768. For 21 years from 1999-2020.
- Founding Editor in Chief of Elsevier's [Journal of Computational Science](#) (JOCS) Impact factor 2.502. May 2010 – December 2020.
- Scientific chair of the A-ranked yearly International Conference on Computational Science see: <https://www.iccs-meeting.org/iccs2020/previous-iccs/>.
- Scientific chair of the largest [conference on complexity science ever in 2016](#) with over 1250 researchers attending. Scientific co-chair of [the same conference 2019 year](#) in Singapore.
- Supervised 57 PhD students till graduation see [here](#).
- Designed and started the [International Master on Computational Science](#)

## Inter-disciplinary Collaboration

Interdisciplinarity is my second name, with a background in chemistry (MSc), Physics (MSc), Computer Science (PhD) and positions in physics, computational science and Complex Systems. I strongly believe that the big challenges that society faces require inter-, cross- and intra- disciplinary approaches, or even maybe non-disciplinary approaches.

That is the reason why I set up institutes like the Institute of Advanced Study in Amsterdam, the Complexity Institute (CI) in Singapore and why I advocate and initiate interdisciplinary MSc programs and why I lead two interdisciplinary -peer reviewed- Elsevier Science Journals. I was recognized by various organizations for this effort, among which is the Leading Scientist Mega Grant (with 3.6 MEuro the largest individual science award in the world) and the medal of honor by the University of Amsterdam (2022).

Connected to many interdisciplinary institutes worldwide, among which are The Complexity Hub in Vienna (where I am an [External Faculty](#)).

Elected research fellow of the [European Center for Living Technology](#) since 2019, a multi-disciplinary initiative.

Wrote and led 5 large interdisciplinary European (Horizon) programs that had consortia across Europe, the US and Asia.

[Publish in international peer reviewed journals](#) with co-authors from Biology, Medicine, Mathematics, Physics, Sociology and Computer Science from over 15 different institutes worldwide.

## Employment History

Research Assistant Dutch Cancer Institute (1983 - 1988);

Post-doctoral researcher (UvA 1989 - 1992);

Assistant Professor (UvA 1993); Associate Professor (UvA 1995);  
Visiting Professor Santa Fe Institute New Mexico (1997)  
Professor Numerical Physics (NNV/UvA 1996-2001),  
Professor Computational Science (UvA 2001 - 2018),  
Chair Computational Science Lorentz centrum (2004 - : <http://www.lorentzcenter.nl>),  
Scientific Director of the Institute for Informatics (UvA) (2007 - 2010).  
Endowed Visiting Professor NTU (Singapore) (2009 - 2013)  
Endowed Professor ITMO, St. Petersburg State University, Russia (2010 - 2013)  
Distinguished Research Professor University of Amsterdam (2011 - 2014)  
Full Professor Complex Systems, NTU, Singapore (2014 -2020)  
*Editor in Chief* of the Elsevier Science: Journal of Computational Science (1999 -2020)  
*Editor in Chief* of the Elsevier Science journal: Future Generation of Computing Systems (2010 - 2020)  
Editor of the Journal Complexity (2017 - ...)  
General Chair of the ICCS series of conferences on Computational Sciences<sup>1</sup> since 2010.  
(Co-)director Complexity Institute NTU, Singapore (2014 - 2020)  
Scientific Director Institute for Advanced Study, Amsterdam (2016 - 2021)  
Professor of Complex Adaptive Systems, UvA (2018 - ...)

**The average number of international keynotes** and invited lectures over the past 5 years were 6 per year.

### Academic qualifications

Bachelor Chemistry and Physics 1980, University of Amsterdam  
Master Chemical Physics, specialization Theoretical Physics 1983, University of Amsterdam  
PhD Netherlands Cancer Institute and UvA, The Netherlands.

**Research interests:** I try to understand how natural and man-made systems processes information. I study this 'natural information processing' in complex systems by computational modeling and simulation as well as through formal methods. My work is applied to a large variety of disciplines. One of the biggest challenges I see is to include behavior and socio-economical dynamics into these models. I am recently (2021) invited by UNESCO to lead complexity science research with a focus on safeguarding inclusiveness in worldwide climate mitigation strategies. See further my [WebPages](#)<sup>2</sup>

**Publications:** Over 500 peer-reviewed journal papers. Listed [here](#).

### Example of five relevant publications

1. S. A. Cheong, T. L. Tan, C.-C. Chen, W.-L. Chang, Z. Liu, L. Y. Chew, P. M. A. **Sloot**, and N. F. Johnson. *Short-Term Forecasting of Taiwanese Earthquakes Using a Universal Model of Fusion-Fission Processes*. Nature Scientific Reports **4**, 3624. (2014)
2. A. Czaplicka.; J.A. Holyst and P.M.A. **Sloot**: *Noise enhances information transfer in hierarchical networks*, Nature Scientific Reports, vol. 3, (2013). (DOI: 10.1038/srep01223)
3. Duijn, P. A., Kashirin, V., & **Sloot**, P. M. (2014). *The Relative Ineffectiveness of Criminal Network Disruption*. Nature Scientific Reports, 4, pp. 4238+15. (2014)
4. Rick Quax, Gregor Chliamovitch, Alexandre Dupuis, Jean-Luc Falcone, Bastien Chopard, Alfons G Hoekstra, and Peter M.A. **Sloot**. *Information processing features can detect behavioral regimes of dynamical systems*. Complexity 2018.
5. J. vd Wal, C. Borkulo, M. Deserno, J. Breedvelt, M. Lees, C. Lokman, D. Borsboom, S. Denys, R. van Holst, M. Smidt, K. Stronks, P. Lucassen, J. van Weert, P.M.A. **Sloot**, C. Bocking, R. Wiers. *Advancing urban mental health research: from complexity to actionable targets for intervention*. The Lancet Psychology 2021 in press).
6. D. Roy, B. Palavalli, N. Menon, R. King, K. Pfeffer, [M. Lees](#), and [P. M. A. Sloot](#). *Survey-based socio-economic data from slums in Bangalore, India*. Nature Scientific Data **5**, 170200. (2018)

### Patents

1. Computer Assisted Centrifugal Elutriation of White Blood-cells: USA patent: 4.939.081. (1990).
2. A decision support system for HIV drugs ranking, Trademark. World coverage: 713908. (2006).
3. SD/Dynamics - Program system for analysis and modeling of information processes in social networks: Software Patent: State registration certificate# 2012617949 (2013)
4. SD/Crawler - Program system for data mining and data analysis in social networks: Software patent: State registration certificate# 2012617951 (2013)
5. Provisional Patent: 'Second Opinion - Clinical Decision Support System': PAT/338/14/15/SG  
Inventors: Emiliano Mancini; P.M.A. Sloot & BUI Quoc Chinh.

<sup>1</sup> <http://www.iccs-meeting.org>

<sup>2</sup> <http://peter-sloot.com>

## H-Index (2023)

- Scholar: H = 62 (~11.000 citations)

## Professional Awards

- ✓ Distinguished professor Numerical Physics, Dutch Physics Society (2000), an award given only once in every 5 years
- ✓ Cheng Tsang Man visiting Professorship, NTU (2008)
- ✓ WorldComp 2009 Science award (Las Vegas, 2009)
- ✓ Dutch I/O award for most visible outreach scientist (2010)
- ✓ Leading Scientist Award (3.6 M€) (St. Petersburg, Russian Federation, 2010), largest individual scientific award in the world<sup>3,4</sup>
- ✓ National Institute for Advanced Studies (NIAS): 2013/2014: Fellow of the Rector
- ✓ [Education Excellence award by Russian Minister of Science \(2017\)](#).

## Brief summary of research over last 5 years / academic profile

Peter Sloot is trained as a Physicist (MSc 1983) and Chemist (MSc 1983) with a specialization in theoretical physics and a PhD from the Dutch Cancer Institute and the Informatics Institute of the UvA (1988), working on early detection of tumor cells, epidemics and immunity. In 2001 he became a full professor of Computational Science at the University of Amsterdam and in 2014 a full professor (0.5 FTE) of Complex System Simulation and director of the complexity Institute at NTU, Singapore. First and foremost, he tries to understand how nature processes information. Accordingly, he studies this 'natural information processing' in complex systems by computational modelling and simulation as well as through formal methods.

What really drives him is the ambition to better understand the complex world around us, from the zillions of molecules in the living cell to the billions of human individuals and countless interacting living organisms that constitute our planet, all interacting in nonlinear and often unpredictable ways. Building on solid disciplinary knowledge and skills, he is convinced that the answer to the larger scientific and societal problems will come from bringing together disciplines and crossing boundaries. Where this attitude to science was a curse when he started his academic career (no funding, no education and no credits for interdisciplinary research), by now there is more recognition for researchers that dare to look across those boundaries. For him personally the pinnacle of this recognition came in two steps. In 2010 he was awarded the 'Leading Scientist Award'. This award and accompanying grant (with 3.6 MEuro the largest individual scientific award globally) were in recognition of his cross disciplinary research in modelling and simulation. The second and most recent major recognition came when the board of the University of Amsterdam asked him in 2016 to lead their ambitious Institute for Advanced Study (IAS), a marvelous initiative, outside the classical faculty and department boundaries, where free thinking and slow science brings scientists from all walks of life together to discuss hard scientific and societal challenges. Just recently UNESCO asked him to lead an UNESCO complexity science initiative.

## International visibility, activities, prizes, scholarships etc.

Over the years, the work of Peter Sloot has been widely acknowledged. Next to receiving the Leading Scientist Award (3.6 M) in 2010, he was awarded a Cheng Tsang Man visiting Professorship, NTU (2008) and he became Distinguished professor Numerical Physics of the Dutch Physics Society (2000), an award given only once in every 5 years. He furthermore received the WorldComp 2009 Science award (Las Vegas, 2009), the Dutch I/O award for most visible outreach scientist (2010), and an Education Excellence award medal by the Russian Minister of Science (2017), and de UvA medal of Honor (2022).

Peter Sloot has been a PI of 5 large EU research projects and 9 National Research Foundation projects. The [ViroLab](#) project (2007–2011), for example, entailed a virtual laboratory to understand the spreading of HIV, had a budget of 6 MEuro for 25 people who jointly produced 60 international peer reviewed journal papers, 9 PhD graduations, and 1 patent. The [DynaNets](#) project (2009–2013) focused on the dynamics of complex networks in crime and contagion, had a budget of 4.5 MEuro for 18 people

<sup>3</sup> <https://www.technologybreakingnews.com/2010/11/russia-awards-3-3-million-euros-to-uva-professor-peter-sloot/>

<sup>4</sup> E.g.: [https://www.youtube.com/watch?v=AAegJFXze\\_k](https://www.youtube.com/watch?v=AAegJFXze_k)

who produced 35 papers, 5 PhD graduations, and 2 software patents. More recently, the [SimCITY](#) project built an infrastructure to detect and act on critical transitions in complex urban systems using a City Simulator, while another project looks at the fundamental causes and effects of socio-economic inequalities in health.

As Editor in Chief, he was involved in two Elsevier Science Journals: Future Generation Computing Systems, with an impact factor of 5.768 (2020), and the Journal of Computational Science with an impact factor of 2.502 (2020). He was also co-editor of the journal Complexity, Chair of the National Platform of Complex Systems (NPCS, established by NWO), Scientific Director of The Complexity Institute of the Nanyang Technological University (2014 onwards), Scientific Director of the Institute for Advanced Study of the UvA (2016 onwards), and Scientific Chair of the International Conference series on Computational Science for the last 20 years. The average number of international keynotes and invited lectures over the past 5 years were 6 per year.

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