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STADIUS
Center for Dynamical Systems, Signal Processing and Data Analytics

STADIUS Newsletter

January 2023

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Welcome

In this issue, we would like to give a special welcome to a new professor at STADIUS: **Rodolphe Sepulchre.**
Please read below his short biography and an interesting story on how to become an astronaut!



New PI - Rodolphe Sepulchre

Rodolphe did his engineering degree (1990) and PhD (1994) in UCLouvain, followed by a postdoc in Santa Barbara (94-96).
He was professor in Liège from 1998 to 2013, when he moved to the department of engineering at the University of Cambridge.
His research is in nonlinear control and optimisation. He just started a new ERC project (2023-2028) entitled "SpikyControl'. The project focuses on neuromorphic control, which aims at taking inspiration of animal brains to develop a novel generation of event-based control systems. He is currently Editor-in-Chief of IEEE Control Systems.
For more information about his interests you can access his editorials as well as other podcasts and publications on his website https://sites.google.com/site/rsepulchre/.

"How to become an astronaut"

Rodolphe Sepulchre talks about Raphael Liégeois, his former PhD student and member of a brand new batch of astronauts at ESA

"I have always known Raphael Liégeois as a pioneer.

He was part of our first cohort of biomedical engineers at the University of Liège, and he was one of my first PhD students to combine research supervision from engineering and neuroscience. In 2014, he was a finalist of the interuniversity competition "Ma thèse en 180 secondes".

After his PhD in Liège and a two-year postdoc in Singapore, Raphaël married Marine.
For their honeymoon, the young couple decided to cycle back home … For six months, they posted short movies on youtube, so that everyone could follow their trip entitled "Sur la route des poètes". Each episode combines the quality of a BBC documentary, making use of the latest drone technology, with a deep and moving testimony of how poetry establishes communication across cultures and backgrounds.

Raphaël's longtime passion is hot air ballooning. As a Phileas Fogg of the 21st century, he is a unique combination of passion and phlegm.

Until recently, I thought the sky would be Raphaël's limit. He proved me wrong.
His stellar trajectory is a wonderful reward for everyone who crossed his route and believed in the value of uncharted territories."

News



Bart De Moor chairman of newly founded "Datanutsbedrijf"

The Flemish Government has nominated Bart De Moor as Chairman of the Board of Directors of the newly founded Flemish "Datanutsbedrijf". This organisation will work on **safety, control and privacy in data sharing**. Also, they will **make data more findable, usable and exchangeable** by building safe bridges between persons, companies and organisations. Their initial projects include improving the sharing of information on degrees, salaries, and real estate, as well as exploring Solid, and developing platforms to access all combined data.

More about the Flemish "Datanutsbedrijf"

More News

- From January 2023 **Johan Suykens** is a member of the editorial board of the **Journal Neural Networks:** https://www.sciencedirect.com/journal/neural-networks

Events @ STADIUS

STADIUS Seminar about spinoff - by Marc Claesen

When: **3/05/2023, 14:00 - 15:30**

Where: **Aula Thermotechnisch Instituut**

Triple Helix for Control: model based, learning and embodied intelligence - by Bram Vanderborght

When: **27/02/2023, 15:00-16:00**

Where: **online**

Part of the webinar series "Machine Learning in Control and Automation", by ESAT STADIUS and VAIA

For more information about STADIUS events please visit the STADIUS Event webpages.

Don't forget to check the website of VAIA for a wide choice in courses on (aspects of) AI: www.vaia.be

New colleagues

A warm welcome to new researchers and personnel at STADIUS!



Hi!
My name is **Robin Bruneel** and I am a mathematical engineer working for Amplifino, a consultancy company specialised in energy related projects.
Since January, I joined the research group of **Prof. Panos Patrinos** as a PhD student. With the help of this research group, I would like to explore novel methods to do probabilistic forecasting in the energy sector and risk-averse trading on the energy market. In my spare time, I enjoy playing tennis tournaments and golf. If you are also a competitive tennis/padel player in Belgium, you will probably know tennisstats.be and padelstats.be: two websites that I have created to predict your tennis/padel ranking as you play tournaments!'

Kind regards,
Robin

New Projects @STADIUS

- **ERC Advanced Grant** *"Spiking Control Systems: an algorithmic theory for control design of physical event-based systems"*
  - STADIUS PI: **Rodolphe Sepulchre**

- **iBOF project:** *"Tensor Tools for Taming the Curse"*
  - Coordinator: UGent: Frank Verstraete (UGent)
  - PIs: **Lieven De Lathauwer, Bart De Moor, Johan Suykens** (STADIUS), Fatemeh Mohammadi (Departments of Computer Science and Mathematics)

- **FWO Project (Senior):** *"User-centric distributed signal processing algorithms for next generation cell-free massive MIMO based wireless communication networks"*
  - PIs: **Marc Moonen** (STADIUS) & Sofie Pollin (WaveCore)

- **FWO Project (Senior):** *"Artificial Intelligence (AI) for data-driven personalised medicine"*
  - PIs: **Maarten De Vos** (STADIUS) & Wim Janssens (UZ Leuven)

- **HORIZON-RIA:** *"AI-PROGNOSIS, Trustworthy artificial intelligence (AI) tools to predict the risk of chronic non-communicable diseases and/or their progression"*.
  - Coordinator: The Aristotle University of Thessaloniki
  - PI at STADIUS: **Maarten De Vos**

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Publication Digest

Here's the monthly STADIUS Publications Digest, including new reports that have been added to the publications database.
Please remember to have your own reports added in the publications database and make sure your entries are kept up to date (status submitted/accepted/published) at all times.

Contact Ida for new additions and updates, do not add/update database content yourself.

23-01

Chen Y., Shen X., Liu Y., Tao Q., Suykens J.A.K., "Jigsaw-ViT: Learning Jigsaw Puzzles in Vision Transformer", *Pattern Recognition Letters*, vol. 166, Jan. 2023, pp. 53-60.
Lirias number: 3992219.

23-02

Schokkaert E., Aerts J.M., Callens S., Eggermont J., Foulon V., Moons P., Noens I., Rademakers F., Van Assche D., Vandenhoeck A., Vander Sloten J., Van Hootegem G., Van Huffel S., Verbrakel J., Vlasselaers D., "The health and Care Professions of the Future", *Metaforum KU Leuven*, Jan. 2023, pp. 1-112.
Lirias number: 3971030.

23-03

Hermans T., Carkeek K., Dereymaeker A., Jansen K., Naulaers G., Van Huffel S., De Vos M., "Partial wavelet coherence as a robust method for assessment of neurovascular coupling in neonates with hypoxic ischemic encephalopathy", *Scientific Reports*, vol. 13, no. 1, Jan. 2023, pp. 457.
Lirias number: 4009605.

23-04

Hermans T., Smets L., Lemmens K., Dereymaeker A., Jansen K., Naulaers G., Zappasodi F., Van Huffel S., Comani S., De Vos M., "A multi-task and multi-channel

convolutional neural network for semi-supervised neonatal artefact detection", Technical Report 23-04, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2023.

23-05

De Vos M., Van Schependom J., "Artificial intelligence will change MS care within the next 10 years : no", *Multiple Sclerosis Journal*, vol. 28, no. 14, Dec. 2022, pp. 2173-2174.
Lirias number: 3992188.

23-06

Brophy E., Redmond P., Fleury A., De Vos M., Boylan G., Ward T., "Denoising EEG Signals for Real-World BCI Applications Using GANs", *Frontiers in Neuroinformatics*, vol. 2, Jan. 2022, pp. 1-11 (art nb. 805573).
Lirias number: 3992196.

23-08

Lagauw S., De Moor S., "Globally optimal SISO H2-norm model reduction", *Proc. of the 42nd Benelux Meeting on Systems and Control*, Elspeet, The Netherlands, Mar. 2023.
Lirias number: 4020026.

23-11

Viroux S., De Moor B., "Connection Between DTLS as an MEVP and as a Riemannian SVD",*Proc. of the 42nd Benelux Meeting on Systems and Control (BENELUX23)*, Elspeet, The Netherlands, Mar. 2023, 1 p.
Lirias number: 4020032.

23-12

Lagauw S., De Moor B., "Globally optimal SISO H2-norm model reduction", *Poster presentation at the SeLMA Closing Event*, Leuven, Belgium, Jun. 2022.
Lirias number: 4020048.

23-13

Lagauw S., De Moor B., "Least squares optimal realisation of SISO LTI systems is an eigenvalue problem", *Poster presentation at the 30th ERNSI Workshop in System Identification (ERNSI22)*, Leuven, Belgium, Sep. 2022.
Lirias number: 4020036.

23-14

Cao Z., Seeuws N., De Vos M., Bertrand A., "A Semi-supervised Interactive Algorithm for Change Point Detection", Technical Report 23-14, ESAT-STADIUS, KU Leuven (Leuven, Belgium), 2023.

23-15

Dan J., *Signal Processing Methods for Home Monitoring of People with Epilepsy with a Network of Wearable EEG Sensors*, PhD thesis, Faculty of Engineering, KU Leuven (Leuven, Belgium), Dec. 2022, 172 p.
Lirias number: 3954779.

23-17

Hermans T., Carkeek K., Dereymaeker A., Jansen K., Naulaers G., Van Huffel S., De Vos M., "Assessing Neurovascular Coupling Using Wavelet Coherence in Neonates with Asphyxia", *Adv Exp Med Biol*, vol. 1395, 2022, pp. 183-187.
Lirias number: 3977840.

23-18

Macea J., Bhagubai M., Broux V., De Vos M., Van Paesschen W., "In-hospital and home-based long-term monitoring of focal epilepsy with a wearable electroencephalography device. Diagnostic yield and user experience", *Epilepsia*, (online), Jan. 2023, pp. 1-37.
Lirias number: 4017686.

23-19

Verstraete K., Das N., Gyselinck I., Topalovic M., Troosters T., Crapo J.D., Silverman E.K., Make B.J., Regan E.A., Jensen R., De Vos M., Janssens W., "Principal component analysis of flow-volume curves in COPDGene to link spirometry with phenotypes of COPD", *Respir Res*, (online), vol. 24, no. 1, Jan. 2023, pp. 1-20.
Lirias number: 4016234.

23-20

Cooray N., Li Z., Wang J., Lo C., Arvaneh M., Symmonds M., Hu M., De Vos M., Mihaylova L.S., "Automated Movement Detection with Dirichlet Process Mixture Models and Electromyography", in *Proc. of the 25th International Conference of*

Information Fusion (FUSION22), Linkoping, Sweden, Jul. 2022, pp. 1-8.
Lirias number: 3885515.



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KU Leuven, ESAT/STADIUS, Kasteelpark Arenberg 10, bus 2446, B-3001 Leuven
ida.tassens@kuleuven.be .