

Dr. Edo van Veen | CV

Personal information

Experienced programmer and data scientist, with a PhD in theoretical quantum physics and a knack for analytical problem solving. Strong written and verbal communication skills. Passionate about science, programming, music and bouldering.

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Work experience

- **Scientific Programmer at TU Delft** June 2020 – present
I develop tools for data acquisition and analysis at the Nynke Dekker lab. We focus on understanding DNA replication using state-of-the-art biophysics. I am responsible for maintaining the entire microscopy data pipeline, as well as developing software for improving and automating data analysis.
- **Data scientist at Asset.Insight.** Feb 2019 – May 2020
I developed machine learning applications for the infrastructure sector, focusing mostly on the railways. For example, I worked on an image recognition project for finding railway track damage, as a consultant at ProRail.
- **PhD in computational condensed matter physics** Nov 2014 – Jan 2019
Atomically thin materials have the potential to make future electronics and optics more efficient and sustainable. I collaborated with an international team of researchers to run high-performance computer simulations on large-scale quantum mechanical models of these materials, using the Dutch national supercomputer. My responsibilities also included supervising student research projects and teaching master's level courses.
- **Freelance web developer and graphic designer** 2008 – 2014
Designing websites, logos and beer labels for small businesses.

Recent projects

- **NAClib: Non-Affine Corrections for microscope images**
A python library for applying a global alignment method for single-molecule fluorescence microscopy. This method employs linear combinations of Zernike polynomial gradients to decompose the distortion between two images (see gitlab.tudelft.nl/nynke-dekker-lab/public/naclib).
- **Classifying train track defects in Eddy current data**
In this project I developed machine learning software for identifying damage types in train tracks using impedance data, measured with Eddy current. The results are used to plan maintenance on the train tracks.
- **Tipsi: a tight-binding propagation simulator for Python**
Software for calculating properties of condensed matter systems containing tens of millions of atoms. The (Fortran) code is optimized for parallel computing on clusters and has a Python user interface (see www.edovanveen.com/tipsi).
- **EdoNet: a minimal neural network for CuPy**
As a hobby project, I wrote my own neural network library from the ground up using only CuPy for Python 3. CuPy provides an easy way to run tensor computations on GPU. See www.github.com/edovanveen/edonet.

Education

- **Radboud University** **Nijmegen**
PhD in computational condensed matter physics 2014 – 2019
Master's in theoretical high energy physics 2012 – 2014
Bachelor's in physics and astronomy, with propaedeutics in mathematics 2008 – 2012
- **Wuhan University** **Wuhan, China**
Visiting PhD scholar 2017 – 2018
- **University of Sydney** **Sydney, Australia**
Master's internship 2012 – 2013

Technical and language skills

- **Computer Languages**

Fluent in: Python (7 years of experience), Fortran
Familiar with: C++, Mathematica, MatLab

- **Human Languages**

Fluent in: Dutch, English
Basic ability with: French, German, Chinese

- **Other technical skills**

Experience with agile/scrum; Linux, OS X and Windows; Git; Microsoft Azure; \LaTeX .

Interests and extra-curricular activities

- **Board and committee work for S.V. Marie Curie**

For two years, I was the vice-president of the physics study association at Radboud University. My main responsibility was sponsor liaison. Also, I was a member of multiple committees, editor in chief for the student magazine, graphic designer for the association, and organizer/translator for a study trip to China.

- **Hobbies and interests**

Bouldering, home brewing, sourdough baking, and playing the jazz-guitar.

Publications

- K.A. McCluskey, E. van Veen, J.P. Cnossen, W.J. Wesselink, F.M. Asscher, C.S. Smith, N.H. Dekker, 'Global correction of optical distortions in multicolor single-molecule microscopy using Zernike polynomial gradients.' *under review (2021)*
- H. Sánchez, K. McCluskey, T. van Laar, E. van Veen, F.M. Asscher, B. Solano, J.F. Duffley, N.H. Dekker, 'DNA replication origins retain mobile licensing proteins.' *Nature Communications*, 12, 1 (2021)
- H. Shi, Z. Zhan, Z. Qi, K. Huang, E. van Veen, J.A. Silva-Guillén, R. Zhang, P. Li, K. Xie, H. Ji, M.I. Katsnelson, S. Yuan, S. Qin, Z. Zhang, 'Large-area, periodic, and tunable pseudo-magnetic fields in low-angle twisted bilayer graphene,' *Nature Communications* 11, 371 (2020)
- E. van Veen, A. Nemilentsau, A. Kumar, R. Roldán, M.I. Katsnelson, T. Low, S. Yuan, 'Tuning 2D hyperbolic plasmons in black phosphorus,' *Physical Review Applied* 12, 014011 (2019)
- G. Slotman, A. Rudenko, E. van Veen, M.I. Katsnelson, R. Roldán, S. Yuan, 'Plasmon spectrum of single-layer antimonene,' *Physical Review B* 98, 155411 (2018)
- E. van Veen, J. Yu, M.I. Katsnelson, R. Roldán, S. Yuan 'Electronic structure of monolayer antimonene nanoribbons under out-of-plane and transverse bias,' *Physical Review Materials* 2, 114011 (2018)
- J. Yu, E. van Veen, M.I. Katsnelson, S. Yuan 'Effective lattice Hamiltonian for monolayer tin disulfide: Tailoring electronic structure with electric and magnetic fields,' *Physical Review B* 97, 245410 (2018)
- T. Westerhout, E. van Veen, M.I. Katsnelson, S. Yuan 'Plasmon confinement in fractal quantum systems,' *Physical Review B* 97, 205434 (2018)
- E. van Veen, A. Tomadin, M. Polini, M.I. Katsnelson, S. Yuan 'Optical conductivity of a quantum electron gas in a Sierpinski carpet,' *Physical Review B* 96, 235438 (2017)
- J. Yu, L. Qu, E. van Veen, M.I. Katsnelson, S. Yuan 'Hyperhoneycomb boron nitride with anisotropic mechanical, electronic, and optical properties,' *Physical Review Materials* 1, 045001 (2017)
- S. Yuan, E. van Veen, M.I. Katsnelson, R. Roldán 'Quantum Hall effect and semiconductor-to-semimetal transition in biased black phosphorus,' *Physical Review B* 93, 245433 (2016)
- E. van Veen, S. Yuan, M.I. Katsnelson, M. Polini, A. Tomadin 'Quantum transport in Sierpinski carpets,' *Physical Review B* 93, 115428 (2016)

References

References available on request.