Renske Vroomans

Curriculum Vitae

PERSONAL DETAILS

Name	dr. Renske Maria Anna Vroomans
Address	184a Perne Road, Cambridge, CB1 3NX, UK
E-Mail	renske.vroomans@gmail.com
Nationality	Dutch

CURRENT POSITION

David Sainsbury Research Career Development Fellow Sept. 2021
Sainsbury Laboratory, University of Cambridge

With my team, I study the evolution of plant development. Using mathematical models to simulate millions of years of plant evolution, we investigate in detail how the accumulation of mutations leads to new developmental programs that make new organs. This gives us a broader understanding of the evolutionary design principles behind plant development.

CAREER HISTORY

Postdoctoral research fellow 2019-2021
Origins Center, Netherlands
funding: NWO Nederlandse WetenschapsAgenda StartImpuls

Postdoctoral researcher 2018-2019
University of Helsinki

Research assistant 2016-2017, 2017-2018
Utrecht University

PhD candidate 2011-2017
Utrecht University

TEACHING

Part III Systems Biology 2023-current
University of Cambridge
4 lectures on evolutionary modelling

Part III Systems Biology 2023-2024
University of Cambridge
Course Coordinator; Data handling and acquisition module organizer

Computational models of evolutionary developmental models 2023
masters' course on developmental biology at ENS-Lyon, France
Practical session on how (and why) to build evodevo models

Evolutionary simulations in the 21st century 2023

EMBO Lecture Course on "The future of evolutionary-developmental systems biology", Venice, Italy

How to model macroscale evolutionary patterns, such as novelty

Evolutionary modelling 2023, 2024

Part III Systems Biology, University of Cambridge

4 lectures on general insights of evolutionary models in biology; design principles of evolutionary models

Workshop "cell-based models: ecology, evolution and development" 2021

Predicting evolution of life Network seminar series, Origins Center

How to use cell-based models to predict general principles of genome, cell and group evolution in bacteria and eukaryotes.

Workshop day 2018

ImageInLife, Horizon 2020 Marie-Curie Innovative training Network

Modelling and simulation of biological development Summer School: section on modeling development with Cellular Potts Model – theoretical underpinnings and practical applications

Guest Lecture 2017

Multiscale Mathematical Biology, Leiden University

Explaining evolution of development and modelling thereof, using my own research as example

Guest Lecture 2014

Third year course of Developmental Biology and Genetics, Utrecht University

Showing how models can be used to study development, using somitogenesis as an example

Guest Lecture 2014

Third year course of Computational Biology, Utrecht University

Discussing insights from models on both Drosophila and vertebrate somitogenesis

Teaching Assistant 2008-2016

First year course of Systems Biology, Utrecht University

Helping students with exercises during practical sessions

INVITED TALKS SINCE 2023

Evolving Individuality 02-12-2024

philosophy workshop, Macquarie University

EuroEvoDevo biennial meeting 25-06-2024

Minisymposium Evolution of Multicellularity

BioSB meeting Netherlands 25-06-2024

Keynote speaker

BSDB/Genetics Society joint meeting UK 16-04-2024

Modelling Development session

Lorentz Workshop 03-04-2024

Evolution of complex contemporary life

Lorentz Workshop 19-12-2023

Simulating Tissue Dynamics with Cellular Potts Models

University of Vermont Biology Seminar 06-11-2023

evolutionary models

Plants Cambridge Festival 30-06-2023

talk on outreach tool "treevodevo"

Max Planck Institute for Evolutionary Biology workshop 25-05-2023

Evolutionary transitions in individuality

OUTREACH TALKS

Chaos Communication Congress 29-12-2024
Biological evolution: writing, rewriting and breaking the program of life
Gatsby Plant Science Education Programme 21-04-2023
"Train the trainer" program
Botanic Garden of Cambridge University 21-04-2023
"Science on Sundays" series
Systems at Play symposium 18-02-2023
Centre Leo Apostle, Vrije Universiteit Brussel

GRANTS

Isaac Newton trust seed funding 2024
Petal pattern evolution, G124011 £49,914
Gatsby Charitable Foundation 2021
David Sainsbury Career Development Fellowship (GAT 3395-CDG) £720,000
Origins Center NL 2019
Postdoctoral Fellowship €95,000

PHD CANDIDATE SUPERVISION

Steven Oud *Petal pattern evolution* 2024-current
Alexandre Porcher Fernandes *Evolution of multicellularity* 2023-current
Pjotr van der Jagt *Evolution of shoot apical meristems* 2022-current

STUDENT SUPERVISION

Sohpia Schuber *Summer student, University of Edinburgh* 2024
Amelia Harvey *Summer student, Durham University* 2024
Ava True *Master student, University of Cambridge* 2023-2024
Maciek Żurowski *Master student, University of Cambridge* 2023-2024
Brychan Thomas *summer student,University of Cambridge* 2023
Wannes Vandenoyenbrugge *summer student,University of Leuven* 2023
Nick van Santen *Master student, University of Amsterdam* 2023
Steven Oud *Master student, University of Amsterdam* 2022, 2023
Sean Thompson *summer student, University of Cambridge* 2022
Abby Cooper *summer student, University of Cambridge* 2022
Pjotr van der Jagt *Master student, University of Amsterdam* 2022
Bram Hoogland *Master student, University of Amsterdam* 2022
Koen Greuell *Master student, University of Amsterdam* 2020
Coen Honingh *Master student, University of Amsterdam* 2020
Levi van Doorn *Master student, Utrecht University* 2020
Wannisa Ritmahan *Master student, Utrecht University* 2017
Sophia Scheper *Master student, Utrecht University* 2015

ORGANISATIONAL ACTIVITIES

Organisor EuroEvoDevo minisymposium 2024
Highlighting developmental divergence and systems drift
Computational Plant Biology Workshop SLCU 2023
local co-organiser
Guest Editor 2022
Special issue on Evolutionary Developmental Biology in Essays on Biochemistry
SLCU outreach committee 2021-current
scientific member
SMB Cell and Developmental Biology subgroup 2020 -2022
scientific committee member
Organising committee Origins Center 2021 meeting 2020 -2021
scientific advisory member
IAS art-science group 2019 2021
Co-founder of an informal discussion and experimentation group on the interface between art, science and philosophy.
Secretary of the Dutch Society for Theoretical Biology (NVTB) 2011-2015
Tasks included membership administration and organising the yearly meeting.

JOURNALS REVIEWED FOR SINCE 2023

- Science
- Nature Communications
- BMC Biology
- PLOS Computational Biology (2x)
- Quantitative Plant Biology
- Biological Reviews
- Frontiers in Cell and Developmental Biology

SKILLS

Software	C/C^{++},Fortran, Python, Bash, LaTeX
Modelling	Cellular Potts Model, EmbryoMaker
	agent-based modelling, ODEs, PDEs, CA
Languages	Dutch (native speaker)
	English (fluent)

REFERENCES

Henrik Jönsson *Director SLCU* henrik.jonsson@slcu.cam.ac.uk
Kirsten ten Tusscher *PhD Supervisor* K.H.W.J.tenTusscher@uu.nl
Edwige Moyroud *Collaborator* edwige.moyroud@slcu.cam.ac.uk
Jaap Kaandorp *Collaborator* J.A.Kaandorp@uva.nl

Scientific productions

- Vroomans RMA, Colizzi ES. 2023. *Evolution of selfish multicellularity: collective organisation of individual spatio-temporal regulatory strategies* BMC Eco Evo 23 (1), 35

- Colizzi ES, Van Dijk B, Merk RMH, Rozen DE, Vroomans RMA. 2023. *Evolution of genome fragility enables microbial division of labor* Mol Sys Biol 19 (3), e11353

- 2024 Book review of: "Computational evolution of neural and morphological development", Yaochu Jin, ISBN 978-981-99-1853-9, Springer, 2023

- Wortel MT *et al.*, 2023. *Towards evolutionary predictions: Current promises and challenges.* Evol Appl 16 (1), 3-21

- Colizzi ES, Hogeweg P, Vroomans RMA. 2022. *Modelling the evolution of novelty: a review* Essays Biochem 66 (6) 727-735

- McGregor AP, Buffry AD, Vroomans RMA. 2022. *A special issue of Essays in Biochemistry on evolutionary developmental biology.* Essays Biochem 66 (6) 703-705

- Vroomans RMA, Helariutta Y. 2022. *In preprints: new insights into root stem cells and their diversity.* Development 149 (13) dev201005

- Vroomans RMA, Ten Tusscher KHWJ. 2021. *Chapter: Modeling Evolution of Developmental Gene Regulatory Networks.* In *Evolutionary Developmental Biology*, Springer Reference

- Hagolani PF, Zimm R, Vroomans RMA, Salazar-Ciudad I. 2021. *On the evolution and development of morphological complexity: a view from gene networks.* PLoS Comput Biol 17 (12), e1009686

- Colizzi ES, Vroomans RMA, Merks RMH. 2020. *Evolution of multicellularity by collective integration of spatial information.* ELife

- Ritmahan W,Kesmir C, Vroomans RMA. 2020. *Revealing factors determining immunodominant responses against dominant epitopes.* Immunogenetics, 1-10

- Li XR, Vroomans RMA, Fox S, Grieneisen VA, Østergaard L, Marée AFM. 2019. *Systems biology approach pinpoints minimum requirements for auxin distribution during fruit opening.* Molecular plant, 12:6

- Bagaev DV, Vroomans RMA, Samir J, Stervbo U, Rius C *et al.,*. 2020. *VDJdb in 2019: database extension, new analysis infrastructure and a T-cell receptor motif compendium.* Nucleic Acids Research 48 (D1), D1057-D1062

- Vroomans RMA, Hogeweg P, Ten Tusscher KHWJ. 2018. Around the clock: gradient shape and noise impact the evolution of oscillatory segmentation dynamics. EvoDevo 9:24

- Shugay M, Bagaev DV, Zvyagin IV, Vroomans RMA, Crawford JC *et al.,*. 2018. *VDJdb: a curated database of T-cell receptor sequences with known antigen specificity.* Nucleic acids research 46 (D1), D419-D427

- Vroomans RMA, Ten Tusscher KHWJ. 2017. *Modelling asymmetric somitogenesis: Deciphering the mechanisms behind species differences.* Dev Biol 427(1): p21-34

- Vroomans RMA, Hogeweg P, Ten Tusscher KHWJ. 2016. In silico *evo-devo: reconstructing stages in the evolution of animal segmentation.* EvoDevo 7:14

- Vroomans RMA, Hogeweg P, Ten Tusscher KHWJ. 2015. *Segment-specific adhesion as a driver of convergent extension.* PLoS Comput Biol 11(2): e1004092

- Vroomans RMA, Marée AFM, de Boer RJ, Beltman JB. 2012. *Chemotactic migration of T cells towards dendritic cells promotes the detection of rare antigens.* PLoS Comput Biol 8(11): e1002763

- A public outreach video explaining my field of research within the Origins Center for a broad audience: https://www.youtube.com/watch?v=4itrKBv5p9A&t=1s

- `/github.com/RenskeVroomans/regulation_evolution` Model for Cellular Potts Model simulations in which cells can evolve their adhesion and genetic regulation

- `/github.com/RenskeVroomans/Vroomans_2016` Model for 1D evodevo simulations selecting for gene expression patterns in 1D tissues [**?**]. Developed as part of my PhD.