

BIOGRAPHICAL SKETCH
Alexander van Oudenaarden

PROFESSIONAL PREPARATION

Delft University of Technology, The Netherlands	Materials Science and Engineering	M.S. 1993
Delft University of Technology, The Netherlands	Physics	M.S. 1993
Delft University of Technology, The Netherlands	Physics	Ph.D. 1998
Stanford University, Stanford, CA	Biophysics	1998 - 1999

APPOINTMENTS

09/2012 – present	Director Hubrecht Institute for Developmental Biology and Stem Cell Research, the Royal Netherlands Academy of Arts and Sciences (KNAW) and University Medical Center Utrecht, Utrecht, The Netherlands.
01/2013 – present	Professor, Faculty of Science, Utrecht University, Utrecht, The Netherlands.
01/2013 – present	Professor, University Medical Center Utrecht, Utrecht, The Netherlands.
09/2009 – 01/2014	Extramural faculty member of the Koch Institute for Integrative Cancer Research at MIT, Cambridge, MA, USA.
05/2009 – 01/2014	Professor of Biology Department of Biology, Massachusetts Institute of Technology, Cambridge, MA, USA.
07/2008 – 01/2014	Professor of Physics Department of Physics, Massachusetts Institute of Technology, Cambridge, MA, USA.
06/2008 – 01/2009	Visiting Professor Hubrecht Institute for Developmental Biology and Stem Cell Research, Utrecht, The Netherlands.
07/2004 – 06/2008	Associate Professor of Physics with tenure Department of Physics, Massachusetts Institute of Technology, Cambridge, MA, USA.
01/2000 – 06/2004	Assistant Professor of Physics Department of Physics, Massachusetts Institute of Technology, Cambridge, MA, USA.
03/1998 – 12/1999	Postdoctoral research Department of Chemistry, Stanford University, Stanford, CA, USA. Laboratory of Prof. S.G. Boxer Micropatterning of supported phospholipid bilayers
03/1998 – 12/1999	Postdoctoral research Department of Biochemistry, Stanford, CA, USA. Laboratory of Prof. J.A. Theriot Force generation of polymerizing actin filaments

HONORS AND AWARDS

- 2017 Dutch Organization for Scientific Research (NWO) Spinoza Award
- 2017 EMBO member
- 2017 European Research Council (ERC) Advanced Grant
- 2015 Member of Koninklijke Hollandsche Maatschappij der Wetenschappen (KHMW)
- 2014 Member of the Royal Netherlands Academy of Arts and Sciences (KNAW)
- 2012 European Research Council (ERC) Advanced Grant
- 2012 Dutch Organization for Scientific Research (NWO) Vici Award
- 2008 NIH Director's Pioneer Award
- 2008 Guggenheim Fellow
- 2007 School of Science Prize for Excellence in Graduate Teaching
- 2001 Keck Career Development Professor in Biomedical Engineering
- 2001 Alfred Sloan Research Fellow
- 2001 NSF CAREER award
- 2000 Edgerly Science Partnership Award
- 1998 Andries Miedema Award for best Ph.D.-research in the field of condensed matter physics in the Netherlands, awarded every other year by Fundamental Research on Matter (FOM).
- 1998 Dutch Organization for Scientific Research (NWO) TALENT stipendium.
- 1998 Ph.D. Applied Physics, *cum laude*.
- 1994 Award for best undergraduate research in Materials Science, yearly award by Delft University of Technology.
- 1993 M.S. Materials Science and Engineering, *cum laude*.

OTHER EXPERIENCE

- 07/2015 – present Member of National Scientific Advisory board, The Netherlands Cancer Institute (NKI)
- 05/2014 – present Advisory editorial board member *Molecular Systems Biology*
- 01/2013 – present Member of the Scientific Advisory Board of the European Molecular Biology Laboratory (EMBL)
- 01/2012 – present Member of the Scientific Advisory Board of the Max Planck Institutes for Molecular Cell Biology and Genetics
- 09/2011 – present Member of the Scientific Advisory Board of the Whitehead Institute for Biomedical Research
- 10/2009 – 07/2012 Director of the MIT Center for Single-Cell Dynamics in Cancer (NIH/NCI funded U54 Physical Sciences-Oncology Center). The goal of this center is use both theoretical and experimental approaches inspired by Physics to attack important problems in cancer biology by developing novel technology and analytical/computational methods to track the dynamics of cancer at the single cell level.
- 06/2007 – 12/2011 Organizer of CSB (Computational and Systems Biology) seminar series.
- 01/2005 – 12/2007 Associate Editor *Biophysical Journal*
- 06/2004 – 07/2006 Course Faculty at the Marine Biology Laboratory (Woods Hole) Summer Course '*Physiology: Modern Cell Biology Using Microscopic, Biochemical and Computational Approaches*'
- 09/2002 – 12/2009 Lecturer and creator of MIT Graduate course 7.81/8.591/9.531 Systems Biology.

PUBLICATION LIST

2019

C. S. Baron, A. Barve, M. J. Muraro, R. van der Linden, G. Dharmadhikari, A. Lyubimova, E. J. P. de Koning, and A. van Oudenaarden.

Cell type purification by single-cell transcriptome-trained sorting.
Cell **179**, 527-542 (2019).

L. van Gulp, M.J. Muraro, T. Dielen, L. Seneby, G. Dharmadhikari, G. Gradwohl, A. van Oudenaarden, and E.J.P. de Koning.

A transcriptomic roadmap to α - and β -cell differentiation in the embryonic pancreas.
Development **146**, dev173716 (2019).

B. Etemad, A. Vertesy, T.E.F. Kuijt, C. Sacristan, A. van Oudenaarden, and G.J.P.L. Kops.

Spindle checkpoint silencing at kinetochores with submaximal microtubule occupancy.
Journal of Cell Science **132**, pii: jcs231589 (2019).

B.J. Pepe-Mooney, M.T. Dill, A. Alemany, J. Ordovas-Montanes, Y. Matsushita, A. Rao, A. Sen, M. Miyazaki, S. Anakk, P.A. Dawson, N. Ono, A.K. Shalek, A. van Oudenaarden, and F.D. Camargo.

Single-Cell Analysis of the Liver Epithelium Reveals Dynamic Heterogeneity and an Essential Role for YAP in Homeostasis and Regeneration.
Cell Stem Cell **25**,23-38 (2019).

E. Driehuis, S. Kolders, S. Spelier, K. Löhmußaar, S.M. Willems, L.A. Devriese, R. de Bree, E.J. de Ruiter, J. Korving, H. Begthel, J.H. van Es, V. Geurts, G.W. He, R.H. van Jaarsveld, R. Oka, M.J. Muraro, J. Vivié, M.M.J.M. Zandvliet, A.P.A. Hendrickx, N. Iakobachvili, P. Sridevi, O. Kranenburg, R. van Boxtel, G.J.P.L. Kops, D.A. Tuveson, P.J. Peters, A. van Oudenaarden, and H. Clevers.

Oral Mucosal Organoids as a Potential Platform for Personalized Cancer Therapy.
Cancer Discovery **9**, 852-871 (2019).

A.C.F. Bolhaqueiro, B. Ponsioen, B. Bakker, S.J. Klaasen, E. Kucukkose, R.H. van Jaarsveld, J. Vivié, I. Verlaan-Klink, N. Hami, D.C.J. Spierings, N. Sasaki, D. Dutta, S.F. Boj, R.G.J. Vries, P.M. Lansdorp, M. van de Wetering, A. van Oudenaarden, H. Clevers, O. Kranenburg, F. Foijer, H.J.G. Snippert, and G.J.P.L. Kops.

Ongoing chromosomal instability and karyotype evolution in human colorectal cancer organoids.

Nature Genetics **51**, 824-834 (2019).

O. Kopper, C.J. de Witte, K. Löhmußaar, J.E. Valle-Inclan, N. Hami, L. Kester, A.V. Balgobind, J. Korving, N. Proost, H. Begthel, L.M. van Wijk, S.A. Revilla, R. Theeuwsen, M. van de Ven, M.J. van Roosmalen, B. Ponsioen, V.W.H. Ho, B.G. Neel, T. Bosse, K.N. Gaarenstroom, H. Vrieling, M.P.G. Vreeswijk, P.J. van Diest, P.O. Witteveen, T. Jonges, J.L. Bos, A. van Oudenaarden, R.P. Zweemer, H.J.G. Snippert, W.P. Kloosterman, and H. Clevers.

An organoid platform for ovarian cancer captures intra- and interpatient heterogeneity.
Nature Medicine **25**, 838-849 (2019).

J.P. Gerlach, J.A.G. van Buggenum, S.E.J. Tanis, M. Hogeweg, B.M.H. Heuts, M.J. Muraro, L. Elze, F. Rivello, A. Rakszewska, A. van Oudenaarden, W.T.S. Huck, H.G. Stunnenberg, and K.W. Mulder.

Combined quantification of intracellular (phospho-)proteins and transcriptomics from fixed single cells.

Scientific Reports **9**, 1469 (2019).

A. Attardi, T. Fulton, M. Florescu, G. Shah, L. Muresan, M.O. Lenz, C. Lancaster, J. Huisken, A. van Oudenaarden, and B. Steventon.

Correction: Neuromesodermal progenitors are a conserved source of spinal cord with divergent growth dynamics.

Development **146**, pii: dev175620 (2019).

N. Sachs, A. Papaspyropoulos, D.D. Zomer-van Ommen, I. Heo, L. Böttinger, D. Klay, F. Weeber, G. Huelsz-Prince, N. Iakobachvili, G.D. Amatngalim, J. de Ligt, A. van Hoeck, N. Proost, M.C. Viveen, A. Lyubimova, L. Teeven, S. Derakhshan, J. Korving, H. Begthel, J.F. Dekkers, K. Kumawat, E. Ramos, M.E. van Oosterhout, G.J. Offerhaus, D.J. Wiener, E.P. Olimpio, K.K. Dijkstra, E.F. Smit, M. van der Linden, S. Jaksani, M. van de Ven, J. Jonkers, A.C. Rios, E.E. Voest, C.H. van Moorsel, C.K. van der Ent, E. Cuppen, A. van Oudenaarden, F.E. Coenjaerts, L. Meyaard, L.J. Bont, P.J. Peters, S.J. Tans, J.S. van Zon, S.F. Boj, R.G. Vries, J.M. Beekman, and H. Clevers.

Long-term expanding human airway organoids for disease modeling.

EMBO Journal **38**, pii: e100300 (2019).

2018

P.E. Boulais, T. Mizoguchi, S. Zimmerman, F. Nakahara, J. Vivié, J.C. Mar, A. van Oudenaarden, and P. Frenette.

The Majority of CD45 Ter119 CD31 Bone Marrow Cell Fraction Is of Hematopoietic Origin and Contains Erythroid and Lymphoid Progenitors

Immunity **49**, 627-639 (2018).

A. Ebbing, A. Vértesy, M.C. Betist, B. Spanjaard, J.P. Junker, E. Berezikov, A. van Oudenaarden, and H.C. Korswagen.

Spatial Transcriptomics of *C. elegans* Males and Hermaphrodites Identifies Sex-Specific Differences in Gene Expression Patterns

Developmental Cell **47**, 801-813 (2018).

A. Attardi, T. Fulton, M. Florescu, G. Shah, L. Muresan, M.O. Lenz, C. Lancaster, J. Huisken, A. van Oudenaarden, and B. Steventon.

Neuromesodermal progenitors are a conserved source of spinal cord with divergent growth dynamics

Development **145**, doi: 10.1242/dev.166728 (2018).

F. Wimmers, N. Subedi, N. van Buuringen, D. Heister, J. Vivié, I. Beeren-Reinieren, R. Woestenenk, H. Dolstra, A. Piruska, J.F.M. Jacobs, A. van Oudenaarden, C.G. Figdor, W.T.S. Huck, I.J.M. de Vries, and J. Tel.

Single-cell analysis reveals that stochasticity and paracrine signaling control interferon-alpha production by plasmacytoid dendritic cells

Nature Communications **9**, 3317 (2018).

E. F. Roovers, L. J. T. Kaaij, S. Redl, A. W. Bronkhorst, K. Wiebrands, A. M. de Jesus Domingues, H. Y. Huang, C. T. Han, S. Riemer, R. Dosch, W. Salvenmoser, D. Grün, F. Butter, [A. van Oudenaarden](#), and R. F. Ketting.

Tdrd6a regulates the aggregation of Buc into functional subcellular compartments that drive germ cell specification.

Developmental Cell **46**, 285-301 (2018).

C. S. Baron, L. Kester, A. Klaus, J. C. Boisset, R. Thambyrajah, L. Yvernogeu, V. Kouskoff, G. Lacaud, [A. van Oudenaarden](#), and C. Robin.

Single-cell transcriptomics reveal the dynamic of haematopoietic stem cell production in the aorta.

Nature Communications **9**, 2517 (2018).

J. C. Boisset, J. Vivié, D. Grün, M. J. Muraro, A. Lyubimova, and [A. van Oudenaarden](#). Mapping the physical network of cellular interactions.

Nature Methods **15**, 547-553 (2018).

L. Kester and [A. van Oudenaarden](#).

Single-cell transcriptomics meets lineage tracing: best of both worlds.

Cell Stem Cell **23**, 166-179 (2018).

Á. Vértesy, W. Arindrarto, M. S. Roost, B. Reinius, V. Torrens-Juaneda, M. Bialecka, I. Moustakas, Y. Ariyurek, E. Kuijk, H. Mei, R. Sandberg, [A. van Oudenaarden](#), and S. M. Chuva de Sousa Lopes.

Parental haplotype-specific single-cell transcriptomics reveal incomplete epigenetic reprogramming in human female germ cells.

Nature Communications **9**, 1873 (2018).

N. C. Rivron, J. Frias-Aldeguer, E. Vrij, J. C. Boisset, J. Korving, J. Vivié, R. Truckenmüller, [A. van Oudenaarden](#), C. A. van Blitterswijk, and N. Geijsen.

Blastocyst-like structures generated solely from stem cells.

Nature **557**, 106-111 (2018).

C. G. Engert, R. Droste, [A. van Oudenaarden](#), and H. R. Horvitz.

A *C. elegans* protein with a PRDM9-like SET domain localizes to chromatin-associated foci and promotes spermatocyte gene expression, sperm production and fertility.

PLoS Genetics **14**: e1007295 (2018).

A. Alemany, M. Florescu, C. S. Baron, J. Peterson-Maduro, and [A. van Oudenaarden](#). Whole-organism clone tracing using single-cell sequencing.

Nature **556**, 108-112 (2018).

C. J. M. Loomans, N. Williams Giuliani, J. Balak, F. Ringnalda, L. van Gulp, M. Huch, S. F. Boj, T. Sato, L. Kester, S. M. C. de Sousa Lopes, M. S. Roost, S. Bonner-Weir, M. A. Engelse, T. J. Rabelink, H. Heimberg, R. G. J. Vries, [A. van Oudenaarden](#), F. Carlotti, H. Clevers, and E. J. P. de Koning.

Expansion of adult human pancreatic tissue yields organoids harboring progenitor cells with endocrine differentiation potential.

Stem Cell Reports **10**, 712-724 (2018).

M. M. Gladka, B. Molenaar, H. de Ruiter, D. Versteeg, G. P. A. Lacraz, S. van der Elst, M. M. H. Huibers, A. van Oudenaarden, and E. van Rooij.

Single-cell sequencing of the healthy and diseased heart reveals Ckap4 as a new modulator of fibroblasts activation.

Circulation **138**, 166-180 (2018).

O. Basak, T. G. Krieger, M. J. Muraro, K. Wiebrands, D. E. Stange, J. Frias-Aldeguer, N. C. Rivron, M. van de Wetering, J. H. van Es, A. van Oudenaarden, B. D. Simons, and H. Clevers.

Troy+ brain stem cells cycle through quiescence and regulate their number by sensing niche occupancy.

PNAS **115**, E610-E619 (2018).

2017

B. Artegiani, A. Lyubimova, M. Muraro, J. H. van Es, A. van Oudenaarden, and H. Clevers.

A single-cell RNA sequencing study reveals cellular and molecular dynamics of the hippocampal neurogenic niche.

Cell Reports **21**, 3271-3284 (2017).

The human cell atlas.

A. Regev, S. A. Teichmann, E. S. Lander, I. Amit, C. Benoist, E. Birney, B. Bodenmiller, P. Campbell, P. Carninci, M. Clatworthy, H. Clevers, B. Deplancke, I. Dunham, J. Eberwine, R. Eils, W. Enard, A. Farmer, L. Fugger, B. Göttgens, N. Hacohen, M. Haniffa, M. Hemberg, S. Kim, P. Klenerman, A. Kriegstein, E. Lein, S. Linnarsson, E. Lundberg, J. Lundeberg, P. Majumder, J. C. Marioni, M. Merad, M. Mhlanga, M. Nawijn, M. Netea, G. Nolan, D. Pe'er, A. Phillipakis, C. P. Ponting, S. Quake, W. Reik, O. Rozenblatt-Rosen, J. Sanes, R. Satija, T. N. Schumacher, A. Shalek, E. Shapiro, P. Sharma, J. W. Shin, O. Stegle, M. Stratton, M. J. T. Stubbington, F. J. Theis, M. Uhlen, A. van Oudenaarden, A. Wagner, F. Watt, J. Weissman, B. Wold, R. Xavier, N. Yosef, and Human Cell Atlas Meeting Participants.

Elife doi: 10.7554/eLife.27041 (2017).

Dynamics of lineage commitment revealed by single-cell transcriptomics of differentiating embryonic stem cells

S. Semrau, J. E. Goldmann, M. Soumillon, T. S. Mikkelsen, R. Jaenisch, and A. van Oudenaarden.

Nature Communications 10.1038/s41467-017-01076-4 (2017).

S. C. van den Brink, F. Sage F, Á. Vértesy, B. Spanjaard, J. Peterson-Maduro, C. S. Baron, C. Robin, and A. van Oudenaarden.

Single-cell sequencing reveals dissociation-induced gene expression in tissue subpopulations.

Nature Methods **14**, 935-936 (2017).

G. P. A. Lacraz, J. P. Junker, M. M. Gladka, B. Molenaar, K. T. Scholman, M. Vigil-Garcia, D. Versteeg, H. de Ruiter, M. W. Vermunt, M. P. Creighton, M. M. H. Huibers, N. de Jonge, A. van Oudenaarden, and E. van Rooij.

Tomo-seq identifies SOX9 as a key regulator of cardiac fibrosis during ischemic injury.

Circulation **136**, 1396-1409 (2017).

J. den Hertog and A. van Oudenaarden.
Celebrating 100 years of Developmental Biology at the Hubrecht Institute.
Developmental Biology **428**, 259-260 (2017).

P. Dierickx, M. W. Vermunt, M. J. Muraro, M. P. Creyghton, P. A. Doevendans, A. van Oudenaarden, N. Geijsen, and L. W. van Laake.
Circadian networks in human embryonic stem cell-derived cardiomyocytes.
EMBO Reports **18**, 1199-1212 (2017).

C. L. Scheele, E. Hannezo, M. J. Muraro, A. Zomer, N. S. Langedijk, A. van Oudenaarden, B. D. Simons, and J. van Rheenen.
Identity and dynamics of mammary stem cells during branching morphogenesis.
Nature **542**, 313-317 (2017).

C. Adolphe, J. P. Junker, A. Lyubimova, A. van Oudenaarden, and B. Wainwright.
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Journal of Investigative Dermatology **137**, 179-186 (2017).

O. Basak, J. Beumer, K. Wiebrands, H. Seno, A. van Oudenaarden, and H. Clevers.
Induced quiescence of Lgr5+ stem cells in intestinal organoids enables differentiation of hormone-producing enteroendocrine cells.
Cell Stem Cell **20**, 177-190 (2017).

2016

S. Amin, R. Neijts, S. Simmini, C. van Rooijen, S. C. Tan, L. Kester, A. van Oudenaarden, M. P. Creyghton, and J. Deschamps.
Cdx and T Brachyury co-activate growth signaling in the embryonic axial progenitor niche.
Cell Reports **17**, 3165-3177 (2016).

D. A. Jaitin, A. Weiner, I. Yofe, D. Lara-Astiaso, H. Keren-Shaul, E. David, T. M. Salame, A. Tanay, A. van Oudenaarden, and I. Amit.
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Cell **167**, 1883-1896 (2016).

M. J. Muraro, G. Dharmadhikari, D. Grün, N. Groen, T. Dielen, E. Jansen, L. van Gorp, M. A. Engelse, F. Carlotti, E. J. de Koning, and A. van Oudenaarden.
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Cell Systems **3**, 385-394 (2016).

N. Sasaki, N. Sachs, K. Wiebrands, S. I. Ellenbroek, A. Fumagalli, A. Lyubimova, H. Begthel, M. van den Born, J. H. van Es, W. R. Karthaus, V. S. Li, C. López-Iglesias, P. J. Peters, J. van Rheenen, A. van Oudenaarden, and H. Clevers.
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PNAS **113**, E5399-E5407 (2016).

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Methods Cell Biology **135**, 299-307 (2016).

D. Mooijman, S. S. Dey, J. C. Boisset, N. Crosetto, and A. van Oudenaarden.
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Nature Biotechnology **34**, 852-856 (2016).

D. Grün, M. J. Muraro, J. C. Boisset, K. Wiebrands, A. Lyubimova, G. Dharmadhikari, M. van den Born, J. van Es, E. Jansen, H. Clevers, E. J. P. de Koning, and A. van Oudenaarden.
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Cell Stem Cell **19**, 266-277 (2016).

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Viral genome imaging of hepatitis C virus to probe heterogeneous viral infection and responses to antiviral therapies.
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E. Beerling, D. Seinstra, E. de Wit, L. Kester, D. van der Velden, C. Maynard, R. Schäfer, P. van Diest, E. Voest, A. van Oudenaarden, N. Vrisekoop, and J. van Rheenen.
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Cell Reports **14**, 2281 – 2288 (2016).

P. W. Tetteh, O. Basak, H. F. Farin, K. Wiebrands, K. Kretzschmar, H. Begthel, M. van den Born, J. Korving, F. de Sauvage, J. H. van Es, A. van Oudenaarden, and H. Clevers.
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Developmental Cell **36**, 36 – 49 (2016).

2015

S. Semrau and A. van Oudenaarden.
Studying lineage decision-making in vitro: emerging concepts and novel tools.
Annual Review Cell and Developmental Biology **13**, 317 – 345 (2015).

D. Grün and A. van Oudenaarden.
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Cell **163**, 799 – 810 (2015).

N. Slavov, S. Semrau, E. Airoidi, B. Budnik, and A. van Oudenaarden.
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Cell Reports **13**, 865 – 873 (2015).

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Y. Q. Soh, J. P. Junker, M. E. Gill, J. L. Mueller, A. van Oudenaarden, and D. C. Page.
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J. P. Junker and A. van Oudenaarden.
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Cell Stem Cell **16**, 158 – 170 (2015).

S. S. Dey, L. Kester, B. Spanjaard, M. Bienko, and A. van Oudenaarden.

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Nature Biotechnology **33**, 285 – 289 (2015).

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