

## **Thorold W. Theunissen, PhD**

September 26, 2026

### **Contact Information**

- Office Address:
  - Phone Number: 314-273-3047
  - Mailing address: 660 S Euclid, Campus Box 8103, St. Louis, MO, 63110
- Email – t.theunissen@wustl.edu

### **Present Position**

|                 |                                                                                                                     |
|-----------------|---------------------------------------------------------------------------------------------------------------------|
| 12/2017-Present | Member, Center of Regenerative Medicine, Washington University in St. Louis                                         |
| 09/2022-Present | Member, Center for Women's Health Engineering, Washington University in St. Louis                                   |
| 10/2023-Present | Associate Professor of Developmental Biology, Washington University School of Medicine in St. Louis                 |
| 12/2023-Present | Co-Director, Human Cells, Tissues, and Organoids (hCTO) Core, Washington University School of Medicine in St. Louis |

### **Education**

#### **Undergraduate**

|                 |                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------|
| 09/2003-07/2007 | Bachelor of Arts, <i>Summa cum laude</i><br>Harvard University, Cambridge, MA (Biology) |
|-----------------|-----------------------------------------------------------------------------------------|

#### **Graduate**

|                 |                                                                                                                                                                                                                                 |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 08/2007-08/2008 | Master of Philosophy<br>King's College, University of Cambridge, UK (Developmental Biology)                                                                                                                                     |
| 09/2008-12/2011 | Doctor of Philosophy<br>King's College, University of Cambridge, UK (Biochemistry)<br>Thesis title: <i>Mechanisms of induced pluripotency: role of the homeodomain transcription factor Nanog</i><br>Advisor: José Silva, Ph.D. |

#### **Post-graduate training**

|                 |                                                                                                                              |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|
| 01/2012-11/2017 | Sir Henry Wellcome Postdoctoral Fellow<br>Whitehead Institute for Biomedical Research, Massachusetts Institute of Technology |
|-----------------|------------------------------------------------------------------------------------------------------------------------------|

Technology, Cambridge, MA, USA  
Advisor: Rudolf Jaenisch, M.D.

## **Academic and Promotion History**

|                 |                                                          |
|-----------------|----------------------------------------------------------|
| 12/2017-10/2023 | Assistant Professor of Developmental Biology             |
| 11/2023-Present | Associate Professor of Developmental Biology with Tenure |

## **Honors and Awards**

|      |                                                           |
|------|-----------------------------------------------------------|
| 2006 | John Harvard Scholarship (top 5% GPA)                     |
| 2007 | Phi Beta Kappa, Harvard University                        |
| 2008 | Cambridge Philosophical Society                           |
| 2012 | Sir Henry Wellcome Postdoctoral Fellowship                |
| 2019 | Shipley Program for Innovation in Stem Cell Science Award |
| 2019 | Edward Mallinckrodt, Jr New Investigator Award            |
| 2019 | NIH Director's New Innovator Award (DP2)                  |
| 2024 | NIH Outstanding Investigator Award (R35)                  |
| 2024 | Edward Mallinckrodt, Jr Scholar Award                     |

## **Editorial and Review Responsibilities**

### **Editorial Positions**

|              |                                                        |
|--------------|--------------------------------------------------------|
| 2022-2025    | Early Career Editorial Board, <i>Stem Cell Reports</i> |
| 2023-Present | Advisory Board, <i>Cell Stem Cell</i>                  |
| 2025-Present | Editorial Board, <i>Stem Cell Reports</i>              |

### **Ad Hoc Manuscript Reviews**

*Advanced Science* (2026), *BMC Biology* (2024), *Cell* (2024-2025), *Cell Press Multi-Journal* (2026), *Cell Reports* (2019, 2022, 2023, 2024), *Cell Stem Cell* (2017-2025), *Current Opinion in Genetics and Development* (2023), *Development* (2018-2026), *Developmental Biology* (2020, 2023), *Developmental Cell* (2021, 2022, 2026), *Developmental Dynamics* (2024), *eLIFE* (2020, 2021), *EMBO Reports* (2022), *Experimental Cell Research* (2019, 2020), *iScience* (2024), *Nature* (2017, 2022, 2023, 2024, 2025, 2026), *Nature Biotechnology* (2017), *Nature Cell Biology* (2020, 2021, 2023), *Nature Communications* (2020-2024), *Nature Methods* (2020, 2022), *Nature Reviews Molecular Cell Biology* (2024-2025), *Placenta* (2024), *PNAS* (2020-2025), *Protein & Cell* (2019), *Science* (2024), *Science Advances* (2018, 2019, 2020, 2023, 2025, 2026), *Stem Cell Reports* (2019-2026), *Trends in Biotechnology* (2024)

### **NIH Review Panels**

|         |                                                                                                                        |
|---------|------------------------------------------------------------------------------------------------------------------------|
| 06/2023 | Adhoc Member, NICHD Special Emphasis Panel ZHD1 DSR-A (50) 1<br>“Physiomimetics and Organoids for Reproductive Health” |
| 02/2025 | Adhoc Member, Cellular, Molecular, and Integrative Reproduction (CMIR) Study                                           |

|          |                                                                                                                |
|----------|----------------------------------------------------------------------------------------------------------------|
|          | Section                                                                                                        |
| 06/2025  | Adhoc Member, Complement-ARIE New Approach Methodologies (NAMs) Technology Development Centers (UM1) RFA Panel |
| 01/2026  | Adhoc Member, Cellular, Molecular, and Integrative Reproduction (CMIR) Study Section                           |
| 07/2026- | Standing Member, Cellular, Molecular, and Integrative Reproduction (CMIR) Study Section                        |

### Extramural Grant Reviews

|      |                                                                    |
|------|--------------------------------------------------------------------|
| 2019 | Wellcome Trust (UK)                                                |
| 2019 | Medical Research Council (UK)                                      |
| 2020 | Agence Nationale de la Recherche (France)                          |
| 2021 | Israel Science Foundation (Israel)                                 |
| 2021 | Medical Research Council (UK)                                      |
| 2022 | Fondo italiano per la Scienza (Italy)                              |
| 2022 | Wellcome Trust (UK)                                                |
| 2023 | Fondation pour la Recherche Médicale (France)                      |
| 2023 | Medical Research Council (UK)                                      |
| 2023 | Biotechnology and Biological Sciences Research Council (UK)        |
| 2023 | Auckland Medical Research Foundation (New Zealand)                 |
| 2023 | Österreichischer Wissenschaftsfonds (Austria)                      |
| 2024 | Governance of Stem Cell-Based Embryo Models Code of Practice (UK)  |
| 2024 | UK Research and Innovation (UK)                                    |
| 2025 | Lalor Foundation (USA)                                             |
| 2025 | Israel Science Foundation (Israel)                                 |
| 2025 | UK Research and Innovation (UK)                                    |
| 2025 | Katholieke Universiteit Leuven (Belgium)                           |
| 2025 | Austrian Academy of Sciences (Austria)                             |
| 2026 | CIHR Joint Canada-Israel Health Research Program (Canada & Israel) |
| 2026 | ZonMw Translational Research (Netherlands)                         |

### **Community Service Contributions**

#### Washington University in St. Louis School of Medicine Committees and Administrative Service:

|              |                                                                                    |
|--------------|------------------------------------------------------------------------------------|
| 2019-2020    | Faculty Search Committee, Department of Developmental Biology                      |
| 2019-2022    | Faculty Search Committee, Center for Reproductive Health Sciences                  |
| 2019-Present | Steering Committee, Developmental, Regenerative, and Stem Cell Biology PhD Program |
| 2019-2025    | Graduate Admission Committee B                                                     |
| 2020-Present | Advisory Board, Researcher Compass                                                 |
| 2022-Present | Viktor Hamburger Lecture Selection Committee                                       |
| 2022-Present | Program Development Committee, Master of Science in Reproductive Sciences          |
| 2025-Present | Faculty Search Committee, Department of Developmental Biology                      |

## Department of Developmental Biology Seminar Series

I have hosted the following speakers in the DB seminar series at Washington University:

|           |                                                        |
|-----------|--------------------------------------------------------|
| 2017-2018 | Kevin Wang (Stanford), Jianlong Wang (Columbia)        |
| 2018-2019 | Stuart Orkin (Harvard), Kathrin Plath (UCLA)           |
| 2019-2020 | Cigall Kadoch (Harvard), Amander Clark (UCLA)          |
| 2020-2021 | Jun Wu (UT Southwestern), Marisa Bartolomei (UPenn)    |
| 2021-2022 | Josien van Wolfswinkel (Yale), Jianping Fu (Michigan)  |
| 2022-2023 | Justin Brumbaugh (Colorado), Bruno Di Stefano (Baylor) |
| 2024-2025 | Berna Sozen (Yale), Jan Zylicz (Copenhagen)            |
| 2025-2026 | Sophie Petropoulos (Montreal)                          |

## Service to Other Universities (External Thesis Examiner):

|      |                         |                             |
|------|-------------------------|-----------------------------|
| 2022 | University of Cambridge | Kate Maskalenka (Rugg-Gunn) |
| 2023 | Monash University       | Jia Ping Tan (Polo)         |

## External Reviewer for Promotion and Tenure

|      |                                       |
|------|---------------------------------------|
| 2025 | Bar Ilan University, Israel           |
| 2026 | Weizmann Institute of Science, Israel |
| 2026 | UT Southwestern Medical Center        |
| 2026 | Yale University                       |
| 2026 | University of Colorado                |

## Membership in Professional Societies:

|              |                                                      |
|--------------|------------------------------------------------------|
| 2012-Present | International Society for Stem Cell Research (ISSCR) |
| 2021-Present | Society for the Study of Reproduction (SSR)          |
| 2022-Present | Society for Developmental Biology (SDB)              |
| 2023-Present | Society for Reproductive Investigation (SRI)         |

## Service in Professional Societies:

|              |                          |                                         |
|--------------|--------------------------|-----------------------------------------|
| 2019-Present | Abstract Reviewer        | ISSCR                                   |
| 2019         | Abstract Reviewer        | Society for Developmental Biology       |
| 2020-Present | Abstract Reviewer        | Society for the Study of Reproduction   |
| 2020         | Session Chair            | SDB Annual Meeting, Boston, MA          |
| 2022         | Session Co-Chair         | ISSCR Annual Meeting, San Francisco, CA |
| 2023-2024    | Public Affairs Committee | Society for the Study of Reproduction   |

## **Consulting Relationships and Board Memberships**

|              |                                  |
|--------------|----------------------------------|
| 2023-Present | Stately Bio, Inc., Palo Alto, CA |
|--------------|----------------------------------|

2025-Present                      e184, Inc., Portland, OR

## **Teaching**

### Major External Invited Presentations, including Professorships and Lectures

2014    International Society for Stem Cell Research, Vancouver, Canada  
2016    International Society for Stem Cell Research, San Francisco, CA  
2019    Society for the Study of Reproduction, San Jose, CA  
2019    University of Missouri, Columbia, MO  
2020    Gibco Global Stem Cells Event (Virtual)  
2021    University of Connecticut, Hartford, CT (Virtual)  
2021    Vanderbilt University, Nashville, TN (Virtual)  
2021    Gilbert S. Greenwald Symposium, Kansas City, KS (Virtual)  
2021    Yale University, New Haven, CT (Virtual)  
2022    Sanford Consortium for Regenerative Medicine, San Diego, CA  
2022    American Society for Reproductive Immunology, Nashville, TN  
2022    International Society for Stem Cell Research, San Francisco, CA  
2022    Saint Louis University, St. Louis, MO  
2022    Baylor College of Medicine, Houston, TX  
2022    University of Colorado Boulder, CO  
2023    UT Southwestern Medical Center, Dallas, TX  
2023    Society for Reproductive Investigation, Brisbane, Australia  
2023    University of Georgia, Athens, GA  
2024    Keystone Symposium on Stem Cell Models for Embryology, Pacific Grove, CA  
2024    Oslo Placenta-Brain Seminar, Oslo, Norway  
2024    Centre for Trophoblast Research, Cambridge, UK  
2024    Cell Symposia: Engineering Development and Disease in Organoids, San Diego, CA  
2024    UCLA Broad Stem Cell Research Center, Los Angeles, CA  
2024    Tsinghua University, Beijing, China  
2024    Symposia on Frontiers in Reproductive Biology, Beijing, China  
2025    McGill University, Montreal, Canada  
2025    Centre de recherche Azrieli, CHU Sainte-Justine, Montreal, Canada  
2025    Vanderbilt University, Nashville, TN (Virtual)  
2025    University of Kansas Medical Center, Kansas City, KS  
2025    Workshop on the 14-Day Limit for Human Embryo Research, San Francisco, CA  
2025    American Society for Reproductive Immunology, St. Paul, MN  
2025    Cold Spring Harbor Asia Meeting on Human Development, Suzhou, China (Virtual)  
2026    Society for Reproductive Investigation, Puerto Rico (Virtual)  
2026    Reproductive and Developmental Biology Lab, Research Triangle Park, NC (Virtual)  
2026    Society on Birth Defects Research and Prevention, Washington DC (Virtual)

### Washington University Presentations & Lectures:

2019    Center for Reproductive Health Sciences  
2019    Department of Genetics

2019 Department of Developmental Biology  
 2019 Center for Cardiovascular Research  
 2020 Genome Engineering & iPSC Center  
 2020 Hope Center NeuroRestorative Therapy Group  
 2021 Pulmonary Research Conference  
 2022 Department of Ophthalmology  
 2023 15 Years of WUSM Developmental Biology Symposium  
 2025 Endocrinology, Metabolism, Obesity, and Diabetes Seminar Series  
 2026 Center for Reproductive Health Sciences

### Courses

2019-Present Instructor BIOL 3240 Human Genetics  
 2019-Present Instructor BIOL 5352 Developmental Biology (Spring)  
 2019-Present Co-Director BIOL 5152 RAD Journal Club (Fall & Spring)  
 2022-Present Co-Director BIOL 5352 Developmental Biology (Spring)  
 2024-Present Instructor BIOL 4073 Human Reproductive Physiology (Fall)  
 2026-Present Instructor REPRSCI 5010 Advanced Topics in Reproductive Sciences (Spring)

### Curriculum Development

2024-2025 Curriculum Executive Team

## **Mentorship & Sponsorship Record**

Served as **faculty research mentor** for:

### High School Students

Current position (for lab alumni):

|              |               |                          |
|--------------|---------------|--------------------------|
| 2024-2025    | Georgia Bland | Undergraduate, UT Austin |
| 2026-Present | Coco Bland    |                          |

### Summer Students

|      |              |                                     |
|------|--------------|-------------------------------------|
| 2025 | Chaoyi Cheng | Undergraduate, Peking University    |
| 2025 | Jinyu Liu    | Undergraduate, University of Oxford |

### Undergraduates

|              |              |                              |
|--------------|--------------|------------------------------|
| 2020-2023    | Eshan Sane   | MD Candidate, WashU Medicine |
| 2025-Present | Olivia Zhang |                              |

### Graduate Students

|           |                          |                                     |
|-----------|--------------------------|-------------------------------------|
| 2018-2022 | Chen Dong (DRSCB)        | Consultant, Boston Consulting Group |
| 2018-2024 | Laura A. Fischer (DRSCB) | Director, hCTO Core, WashU Medicine |

|              |                        |                               |
|--------------|------------------------|-------------------------------|
| 2022-2024    | Joey Zemke (DRSCB)     | PhD Candidate, WashU Medicine |
| 2022-2026    | Kyoung-mi Park (DRSCB) | Postdoctoral Fellow, NIH      |
| 2023-Present | Richard Yin (DRSCB)    |                               |
| 2024-Present | Serene Mattis (BME)    |                               |
| 2024-Present | Peiheng Liu (MCB)      |                               |

#### Postbaccalaureates

|           |                  |                                     |
|-----------|------------------|-------------------------------------|
| 2024-2026 | Rosa Loewenstein | Research Technician, WashU Medicine |
|-----------|------------------|-------------------------------------|

#### Postdoctoral Trainees

|              |                      |                                        |
|--------------|----------------------|----------------------------------------|
| 2019-2023    | Shafqat A. Khan, PhD | Staff Scientist, WashU Medicine        |
| 2020-2024    | Rowan M. Karvas, PhD | Assistant Professor, Univ. of Colorado |
| 2024-Present | Xiangyu Kong, PhD    |                                        |
| 2026-Present | Regan L. Scott, PhD  |                                        |

#### Research Technicians

|              |                  |                                         |
|--------------|------------------|-----------------------------------------|
| 2018-2022    | Kyoung-mi Park   | PhD Candidate, WashU Medicine           |
| 2020-2022    | Brian Chew       | PhD Candidate, University of Pittsburgh |
| 2022-Present | Brittany Meyer   |                                         |
| 2026-Present | Rosa Loewenstein |                                         |

#### Staff Scientists

|              |                      |  |
|--------------|----------------------|--|
| 2023-Present | Shafqat A. Khan, PhD |  |
|--------------|----------------------|--|

Served on **qualifying examinations** for:

|      |       |                           |
|------|-------|---------------------------|
| 2019 | DRSCB | Sadie VanHorn (Morris)    |
| 2020 | DRSCB | Jennysue Kasiah (McNeill) |
| 2021 | DRSCB | Marlie Maestas (Millman)  |
| 2022 | DRSCB | Mini Yuan (Yoo)           |
| 2024 | DRSCB | Yoon Lee (Yoo)            |
| 2024 | DRSCB | Ariel Telger (Greer)      |
| 2024 | DRSCB | Zack Skovgaard (Meers)    |
| 2025 | DRSCB | Jenny Snak (Yi)           |

Served on **thesis committees** for:

|           |       |                                  |
|-----------|-------|----------------------------------|
| 2020-2021 | DRSCB | Leonardo Velazco-Cruz (Millman)  |
| 2020-2023 | DRSCB | Keenan Bates (Herzog)            |
| 2020-2024 | DRSCB | Matthew Mosley (Pincus/Kornfeld) |
| 2021      | DRSCB | Sarah Waye (Morris)              |
| 2021-2024 | DRSCB | Sadie VanHorn (Morris)           |

|              |       |                          |
|--------------|-------|--------------------------|
| 2022-Present | DRSCB | Mini Yuan (Yoo)          |
| 2024-Present | DRSCB | Zack Skovgaard (Meers)   |
| 2021-2024    | MCB   | Jason Colasanti (Apte)   |
| 2022-2024    | MCB   | Noah DeGeorgia (Kaufman) |
| 2022-2023    | MGG   | Kitra Cates (Yoo)        |
| 2023-Present | MGG   | Jessica Harrison (Wang)  |
| 2023-Present | MGG   | Kaci Martin (Frolova)    |
| 2023-Present | CSB   | Douglas Abrams (Morris)  |
| 2024-2026    | BME   | Martina Marras (Silva)   |
| 2024-Present | BME   | Erica Marquez (Silva)    |
| 2026-Present | CSB   | Rachel Wu (Wang)         |

#### Mentorship Training:

|      |                                                               |
|------|---------------------------------------------------------------|
| 2019 | Maximizing Research Mentoring Relationships Workshop          |
| 2024 | Optimizing the Practice of Mentoring, University of Minnesota |
| 2024 | Compass Training and Mentoring Program                        |

#### Media Activities

|      |                                            |
|------|--------------------------------------------|
| 2004 | <i>The Harvard Crimson</i>                 |
| 2017 | <i>Cambridge Stem Cell News</i>            |
| 2018 | <i>Axios</i>                               |
| 2019 | <i>Cell Stem Cell</i>                      |
| 2020 | <i>Washington University Medicine News</i> |
| 2021 | <i>Science Magazine</i>                    |
| 2022 | <i>Cell Stem Cell</i>                      |
| 2023 | <i>The Stem Cell Podcast</i>               |
| 2025 | <i>The Stem Cell Report</i>                |
| 2025 | <i>Science Magazine</i>                    |

#### Research

##### Present Extramural Grants:

|                                                                                                                                                            |                                           |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|
| NIH/NIGMS R35GM153439-01                                                                                                                                   | Theunissen (PI)                           | 2024-2029 |
| Resolving epigenetic instability during pluripotent state transitions: a roadmap for exploiting the biomedical potential of dynamic human stem cell states |                                           |           |
| NIH/NICHD R01HD119277-01                                                                                                                                   | Theunissen, Dietmann, Kroll, Soncin (MPI) | 2025-2030 |
| Modeling human trophoblast differentiation and function using pluripotent stem cells                                                                       |                                           |           |
| NIH/NICHD R21HD112754-01                                                                                                                                   | Theunissen (PI)                           | 2023-2025 |
| Mechanisms of X chromosome inactivation during human trophoblast differentiation <i>in vitro</i>                                                           |                                           |           |

|                                                                                 |                 |           |
|---------------------------------------------------------------------------------|-----------------|-----------|
| Mallinckrodt Scholar Award                                                      | Theunissen (PI) | 2024-2028 |
| A stem-cell-based model system of human embryo implantation and its pathologies |                 |           |

Past Extramural Grants:

|                                                                                                                                                            |                 |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------|
| NIH/NIGMS DP2 GM137418                                                                                                                                     | Theunissen (PI) | 2019-2024 |
| Resolving epigenetic instability during pluripotent state transitions: a roadmap for exploiting the biomedical potential of dynamic human stem cell states |                 |           |

|                                                             |                 |           |
|-------------------------------------------------------------|-----------------|-----------|
| Shipley Foundation                                          | Theunissen (PI) | 2019-2024 |
| Generation of synthetic embryo models from human stem cells |                 |           |

|                                                             |                 |           |
|-------------------------------------------------------------|-----------------|-----------|
| Mallinckrodt Foundation                                     | Theunissen (PI) | 2019-2022 |
| Generation of synthetic embryo models from human stem cells |                 |           |

|                                                                                     |                                         |           |
|-------------------------------------------------------------------------------------|-----------------------------------------|-----------|
| Children's Discovery Institute                                                      | Theunissen, Solnica-Krezel, Kroll (MPI) | 2019-2023 |
| Establishing novel stem cell platforms to model developmental disorders in children |                                         |           |

Entrepreneurship/Patents:

1. **Theunissen, T.W.**, Gray, N., and R. Jaenisch. Uses of kinase inhibitors for inducing and maintaining pluripotency (2024). US Patent 12,123,019.
2. **Theunissen, T.W.**, Khan, S.A., and R. Jaenisch. Enhanced methods for inducing and maintaining naïve human pluripotent stem cells (2025). US Patent 12,371,667.
3. Karvas, R.M. and **T.W. Theunissen**. Derivation of trophoblast organoids from naïve human pluripotent stem cells. US Patent App. 18/312,488.
4. Karvas, R.M. and **T.W. Theunissen**. Methods and systems for extended culture of human blastoids to post-implantation stages on 3D matrices. US Patent App. 18/600,769
5. Fischer, L.A. and **T.W. Theunissen**. Methods for tracking and mitigating imprint erasure in human pluripotent stem cells (2025). Washington University in St. Louis (021252/US).

**Bibliography:** *senior author abstracts and papers are indicated with an asterisk (\*)*

**A. Original, peer-reviewed articles in refereed journals:**

1. Wang, J., Rao, S., Chu, J., Shen, X., Levasseur, D.N., **Theunissen, T.W.**, and S.H. Orkin (2006). A protein interaction network for pluripotency of embryonic stem cells. *Nature* 444, 364-368.
2. Wang, J., **Theunissen, T.W.**, and S.H. Orkin (2007). Site-directed, virus-free and inducible RNAi in embryonic stem cells. *Proceedings of the National Academy of Sciences of the U.S.A.* 104, 20850-5.
3. Silva, J., Barrandon, O., Nichols, J., Kawaguchi, J., **Theunissen, T.W.**, and A. Smith (2008). Promotion of reprogramming to ground state pluripotency by signal inhibition. *PLoS Biology* 6(10), e253.

4. Silva, J., Nichols, J., **Theunissen, T.W.**, Guo, G., van Oosten, A., Barrandon, O., Wray, J., Yamanaka, S., Chambers, I., and A. Smith (2009). Nanog is the gateway to the pluripotent ground state. *Cell* 138(4), 722-737.
5. Tee, W.W., Pardo, M., **Theunissen, T.W.**, Yu, L., Choudhary, J.S., Hajkova, P., and M.A. Surani (2010). Prmt5 is essential for early mouse development and acts in the cytoplasm to maintain ES cell pluripotency, *Genes & Development* 24, 2772-2777.
6. Yang, J., van Oosten, A., **Theunissen, T.W.**, Guo, G., Silva, J.C.R., and A. Smith (2010). STAT3 activation is limiting for reprogramming to ground state pluripotency. *Cell Stem Cell* 7, 319-328.
7. **Theunissen, T.W.**, van Oosten, A., Castelo-Branco, G., Hall, J. Smith, A., and J.C.R. Silva (2011). Nanog overcomes reprogramming barriers and induces pluripotency in minimal conditions, *Current Biology* 21, 65-71.
8. **Theunissen, T.W.**, Costa, Y., Radzisheuskaya, A., van Oosten, A.L., Lavial, F., Pain, B., Castro, L.F.C., and J.C.R. Silva (2011). Reprogramming capacity of Nanog is functionally conserved in vertebrates and resides in a unique homeodomain. *Development* 138, 4853-4865.
9. Costa, Y.\*, Ding, J.\*, **Theunissen, T.W.\***, Faiola, F.\*, Hore, T.A., Shliha, P.V., Fidalgo, M., Saunders, A., Lawrence, M., Dietmann, S., Das, S., Levasseur, D.N., Li, Z., Xu, M., Reik, W., Silva, J.C.R. and J. Wang (2013). NANOG-dependent function of TET1 and TET2 in establishment of pluripotency, *Nature* 495, 370-374. \*Co-first author.
10. Radzisheuskaya, A., Chia Gle, B., dos Santos, R.L., **Theunissen, T.W.**, Castro, L.F., Nichols, J., and J.C. Silva (2013). A defined Oct4 level governs cell state transitions of pluripotency entry and differentiation into all embryonic lineages. *Nature Cell Biology* 15, 579-590.
11. Cheng, A.W., Wang, H., Yang, H., Shi, L., Katz, Y., **Theunissen T.W.**, Rangarajan, S., Shivalila, C.S., Dadon, D.B., and R. Jaenisch (2013). Multiplexed activation of endogenous genes by CRISPR-on, an RNA-guided transcriptional activator system. *Cell Research* 23, 1163-1171.
12. Przybyla, L., **Theunissen, T.W.**, Jaenisch, R., and J. Voldman (2013). Matrix remodeling maintains ESC self-renewal by activating Stat3, *Stem Cells* 31, 1097-1106.
13. **Theunissen, T.W.\***, Powell, B.E.\*, Wang, H.\*, Mitalipova, M., Faddah, D., Maetzel, D., Ganz, K., Shi, L., Stelzer, Y., Zhang, J., Lungjangwa, T., Imsoonthornruksa, S., Rangajaran, S., Fan, Z.P., Young, R.A., Gray, N., and R. Jaenisch (2014). Systematic identification of culture conditions for induction and maintenance of naive human pluripotency, *Cell Stem Cell* 15, 471-487. \*Co-first author.
14. De Los Angeles, A., Ferrari, F., Fujiwara, Y., Mathieu, R., Lee S., ... **Theunissen, T.W.** (Author 11) ... Jaenisch, R., Deng, H., Orkin S.H., Park, P.J., and G.Q. Daley (2015). Failure to replicate the STAP cell phenomenon. *Nature* 525, E6-E9.
15. **Theunissen, T.W.\***, Friedli, M.\*, He, Y.\*, Planet, E., Oneil, R., ... Drotar, J., Lungjangwa, T., Trono, D., Ecker, J.R., and R. Jaenisch (2016). Molecular criteria for defining the naive human pluripotent state. *Cell Stem Cell* 19, 1-14. \*Co-first author.
16. Sahakyan, A., Kim, R., Chronis, C., Sabri, S., Bonora, G., **Theunissen, T.W.**, Kuoy, E., Langerman, J., Clark, A.T., Jaenisch, R., and K. Plath (2017). Human naive pluripotent stem cells model X chromosome dampening and X inactivation. *Cell Stem Cell* 20, 87-101.

17. Pontis, J., Planet, E., Offner, S., Turelli, P., Duc, J., Coudray, A., **Theunissen, T.W.**, Jaenisch, R., and D. Trono (2019). Hominid-specific transposable elements and KZFPs facilitate human embryonic genome activation and control transcription in naive human ESCs. *Cell Stem Cell* 24, 724-735.
18. Lawrence, M., **Theunissen, T.W.**, Lombard, P., Adams, D.J., and J.C.R. Silva (2019). ZMYM2 inhibits NANOG-mediated reprogramming. *Wellcome Open Research* 4: 88.
19. \*Dong, C., Beltcheva, M., Gontarz, P., Zhang, B., Popli, P., Fischer, L.A., Khan, S.A., Park, K., Yoon, E., Xing, X., Kommagani, R., Wang, T., Solnica-Krezel, L., and **T.W. Theunissen** (2020). Derivation of trophoblast stem cells from naive human pluripotent stem cells. *eLife* 9, e52504.
20. \*Khan, S.A., Park, K., Fischer, L.A., Dong, C., Lungjangwa, T., Jimenez, M., Casalena, D., Chew, B., Dietmann, S., Auld, D.S., Jaenisch, R., and **T.W. Theunissen** (2021). Probing the signaling requirements for naive human pluripotency by high-throughput chemical screening. *Cell Reports* 35, 109233.
21. \*Huang, X., Park, K., Gontarz, P., Zhang, B., Pan, J., McKenzie, Z., Fischer, L.A., Dong, C., Dietmann, S., Xing, X., Shliaha, P.V., Yang, J., Li, D., Ding, J., Lungjangwa, T., Mitalipova, M., Khan, S.A., Imsoonthornruksa, S., Jensen, N., Wang, T., Kadoch, C., Jaenisch, R., Wang, J., and **T.W. Theunissen** (2021). OCT4 cooperates with distinct ATP-dependent chromatin remodelers in naïve and primed pluripotent states in human. *Nature Communications* 12, 5123.
22. \*Karvas R.M., Khan, S.A., Verma, S., Yin, Y., Kulkarni, D., Dong, C., Park, K., Chew, B., Sane, E., Fischer, L.A., Kumar, D., Ma, L., Boon, A.C.M., Dietmann, S., Mysorekar, I.U., and **T.W. Theunissen** (2022). Stem-cell-derived trophoblast organoids model human placental development and susceptibility to emerging pathogens. *Cell Stem Cell* 29, 810-825.
23. \*Dong, C., Fu, S., Karvas, R.M., Chew, B., Fischer, L.A., Xing, X., Harrison, J., Popli, P., Kommagani, R., Wang, T., Zhang, B., and **T.W. Theunissen** (2022). A genome-wide CRISPR-Cas9 knockout screen identifies essential and growth-restricting genes in human trophoblast stem cells. *Nature Communications* 13, 2548.
24. \*Karvas, R.M., Zemke, J.E., Ali, S.S., Sane, S., Dong, C., Fischer, L.A., Park, K., Upton, E., Wang, F., Park, K., Hao, S., Chew, B., Meyer, B., Zhou, C., Dietmann, S., and **T.W. Theunissen** (2023). 3D-cultured blastoids model human embryogenesis from pre-implantation to early gastrulation stages. *Cell Stem Cell* 30, 1-18.
25. \*Guo, M., Wu, J., Chen, C., Wang, X., Gong, A., Guan, W., Karvas, R.M., Wang, K., Min, M., Wang, Y., **Theunissen, T.W.**, Gao, S., and J.C.R. Silva (2024). Self-renewing human naïve pluripotent stem cells dedifferentiate in 3D culture and form blastoids spontaneously. *Nature Communications* 15, 668.
26. \*Morey, R., Bui, T., Cheung, V.C., Dong, C., Zemke, J.E., Requena, D., Arora, H., Jackson, M.G., Pizzo, D., **Theunissen, T.W.**, and M. Horii (2024). *iScience* 27: 109569.
27. \*Lam, I., Ndayisaba, A., Lewis, A.J., Fu, Y., Sagredo, G.T., ... **Theunissen, T.W.** (Author 27) ... Elledge, S.J., Dettmer, U., Halliday, G.M., Bartels, T., and V. Khurana (2024). Rapid iPSC inclusionopathy models shed light on formation, consequence and molecular subtype of  $\alpha$ -synuclein inclusions. *Neuron* 112, 2886-2909.
28. \*Kumar, D., Karvas, R.M., Jones, B.R., McColl, E.R., Diveley, E., Jasj, S., Sharma, S., Kelly, J.C., **Theunissen, T.W.**, and I.U. Mysorekar (2024). SARS-CoV-2 ORF3a

- protein impairs syncytiotrophoblast maturation, alters ZO-1 localization, and shifts autophagic pathways in trophoblast cells and 3D organoids. *bioRxiv*, doi: <https://doi.org/10.1101/2024.09.25.614931>.
29. \*Fischer, L.A., Meyer, B., Reyes, M., Zemke, J.E., Harrison, J.K., Park, K., Wang, T., Juppner, H., Dietmann, S., and **T.W. Theunissen** (2025). Tracking and mitigating imprint erasure during induction of naïve human pluripotency at single-cell resolution. *Stem Cell Reports*, 20, 102419.
  30. \*Yoon, E., Beltcheva, M., Ali, S.S., Fu, S., Yang, A., Dong, C., Zemke, J.E., Karvas, R.M., Chang, C., Fischer, L.A., Gontarz, P., Zhang, B., Dietmann, S., **Theunissen, T.W.**, and L. Solnica-Krezel (2025). *Development* 152 (17): dev204309.
  31. \*Biondic, S., Zhao, C., Yin, R., **Theunissen, T.W.**, and S. Petropoulos (2025). Dissecting small noncoding RNA landscapes in mouse preimplantation embryos and human blastoids for modeling early human embryogenesis. *bioRxiv*, doi: 10.1101/2025.10.07.680944
  32. Arias, A.M., Rivron, N., Tajbakhsh, S., Johnston, J., Alev, C., Bally-Cuif, L., Böke, E., Cavazza, T., Cave, E., Cyranoski, D., David, L., Esteban, M.A., Fu, J., Geijsen, N., de Graeff, N., Hanna, J.H., Hopwood, N., Inamdar, M.S., Lanner, F., Leeners, B., Liu, Z., Leon, M.J., Minchiotti, G., Moris, N., Munsie, M., Niakan, K.K., Pourquié, O., Pasque, V., Pera, M., Peng, Y., Petropoulos, S., Ramanathan, S., Rossant, J., Rugg-Gunn, P., Saitou, M., Sermon, K., Silva, J., **Theunissen, T.W.**, Turco, M., Wallingford, J., Wang, H., Warmflash, A., Wu, J., and Yu, L. (2026). Human stem cell-based embryo models: innovation, ethics, and policy. *Hum Reprod*, doi: 10.1093/humrep/deag035.
  33. McColl, E.R., Kumar, D., Jones, B.R., Marks, N., Diveley, E., Karvas, R., **Theunissen T.W.**, Kelly, J.C., and I.U. Mysorekar (2026). Placental trophoblasts exhibit iron dysregulation and ferroptosis signaling associated with SARS-CoV-2 restriction. *Cell Reports*, 45, 118040

## B. Reviews, Chapters, and Editorials:

1. Orkin, S.H., Wang, J., Kim, J., Chu, J., Rao, S., **Theunissen, T.W.**, Shen, X., and D.N. Levasseur (2008). The transcriptional network controlling pluripotency in ES cells. *Cold Spring Harb. Symp. Quant. Biol.* 73, 195-202.
2. **Theunissen, T.W.** and J.C.R. Silva (2011). Switching on pluripotency: a perspective on the biological requirement of Nanog. *Philos. Trans. R. Soc. Lond., B., Biol. Sci.* 366, 2222-2229.
3. **Theunissen, T.W.** and J.C.R. Silva (2012). Somatic cell reprogramming: role of homeodomain protein Nanog, in *Stem Cells and Cancer Stem Cells: Therapeutic Applications in Disease and Injury*. Edited by M.A. Hyat. Springer, New York, NY.
4. **Theunissen, T.W.** and R. Jaenisch (2014). Molecular control of induced pluripotency. *Cell Stem Cell* 14, 720-734.
5. **Theunissen, T.W.** and R. Jaenisch (2017). Mechanisms of gene regulation in human embryos and pluripotent stem cells. *Development* 144: 4496-4509.
6. \*Dong, C., Fischer, L.A. and **T.W. Theunissen** (2019). Recent insights into the naïve state of human pluripotency and its applications. *Exp. Cell Res.* 385, 111645.
7. \*Fischer, L.A., Khan, S., and **T.W. Theunissen** (2022). Induction of human naïve

- pluripotency using 5i/L/A media, in *Methods in Molecular Biology: Human Naïve Pluripotent Stem Cells*. Edited by P. Rugg-Gunn. Springer, New York, NY.
8. \*Dong, C. and **T.W. Theunissen** (2022). Generation of trophoblast stem cells from human naïve pluripotent stem cells, in *Methods in Molecular Biology: Human Naïve Pluripotent Stem Cells*. Edited by P. Rugg-Gunn. Springer, New York, NY.
  9. \*Karvas, R.M., David, L., and **T.W. Theunissen** (2022). Accessing the trophoblast stem cell state from human pluripotent and somatic cells. *Cell. Mol. Life Sci.* 79, 604.
  10. \*Karvas, R.M., and **T.W. Theunissen** (2023). Generation of 3D trophoblast organoids from human naïve pluripotent stem cells, in *Methods in Molecular Biology: Human Embryo Models In Vitro*. Edited by K. Turksen and M. Zernick-Goetz. Springer, New York, NY.
  11. \*Khan, S.A. and **T.W. Theunissen** (2023). Modeling X chromosome inactivation and reactivation during human development. *Curr. Opin. Genet. Dev.* 82, 102096.
  12. \*Liu, P., Mattis, S., and **T.W. Theunissen** (2025). Stem cell models of human embryo implantation and trophoblast invasion. *Curr. Opin. Genet. Dev.* 93,102357.
  13. \*Kong, X. and **T.W. Theunissen** (2025). Raising the bar for human post-implantation embryo models. *Cell Stem Cell* 32, 1479-1481.
  14. \*Kong, X. and **T.W. Theunissen** (2025). Primate embryo model leaps across developmental boundaries. *Nature*, doi: 10.1038/d41586-025-03729-7.
  15. \*Park, K., Yin, R., and **T.W. Theunissen** (2026). Exiting the ground state: the broad spectrum of cell fates accessible from naïve human pluripotent stem cells. *Cell. Mol. Life Sci.* 83, 23.

### C. Abstracts:

1. **Theunissen, T.W.**, Powell, B.E., Wang, H., Zhang, J., Gray, N., and R. Jaenisch (2014). A chemical platform for induction and maintenance of naïve human pluripotency. *ISSCR Annual Meeting 2014*. Oral presentation.
2. **Theunissen, T.W.**, Friedli, M., He, Y., Planet, E., Oneil, R., ... Huang, Y., Nery, J., Trono, D., Ecker, J.R., and R. Jaenisch. Naïve pluripotent stem cells display molecular signatures of the human pre-implantation embryo. *ISSCR Annual Meeting 2016*. Oral presentation.
3. \*Dong, C., Beltcheva, M., Gontarz, P., Zhang, B., Popli, P., Fischer, L.A., Khan, S.A., Park, K., Yoon, E., Xing, X., Kommagani, R., Wang, T., Solnica-Krezel, L., and **T.W. Theunissen**. Derivation of trophoblast stem cells from naïve human pluripotent stem cells. *ISSCR Annual Meeting 2020*. Oral presentation.
4. \*Dong, C., Beltcheva, M., Gontarz, P., Zhang, B., Popli, P., Fischer, L.A., Khan, S.A., Park, K., Yoon, E., Xing, X., Kommagani, R., Wang, T., Solnica-Krezel, L., and **T.W. Theunissen**. Derivation of trophoblast stem cells from naïve human pluripotent stem cells. *Keystone Meeting on Tissue Plasticity 2020*. Poster presentation.
5. \*Dong, C., Beltcheva, M., Gontarz, P., Zhang, B., Popli, P., Fischer, L.A., Khan, S.A., Park, K., Yoon, E., Xing, X., Kommagani, R., Wang, T., Solnica-Krezel, L., and **T.W. Theunissen**. Derivation of trophoblast stem cells from naïve human pluripotent stem cells. *Development Meeting: From Stem Cells to Human Development 2020*. Poster presentation.
6. \*Dong, C., Fu, S., Chew, B., Zhang, B., and **T.W. Theunissen**. A genome-wide

- CRISPR-Cas9 knockout screen identifies essential and growth-restricting genes in human trophoblast stem cells. *ISSCR Annual Meeting 2021*. Oral presentation.
7. \*Karvas, R., Verma, S., Dietmann, S., Mysorekar, I., and T.W. Theunissen. 3D organoids generated from human trophoblast stem cells model early placental development and susceptibility to emerging viral infections. *ISSCR Annual Meeting 2021*. Poster presentation.
  8. \*Karvas, R., Verma, S., Dietmann, S., Mysorekar, I., and T.W. Theunissen. 3D organoids generated from human trophoblast stem cells model early placental development and susceptibility to emerging viral infections. *NIH High-Risk High-Reward Research Symposium 2021*. Poster presentation.
  9. \*Karvas, R., Verma, S., Dietmann, S., Mysorekar, I., and T.W. Theunissen. 3D organoids generated from human trophoblast stem cells model early placental development and susceptibility to emerging viral infections. *Embryonic/Extraembryonic Interfaces: Engineering Development Meeting 2021*. Oral presentation.
  10. \*Karvas, R., Verma, S., Dietmann, S., Mysorekar, I., and T.W. Theunissen. 3D organoids generated from human trophoblast stem cells model early placental development and susceptibility to emerging viral infections. *SSR Annual Meeting 2021*. Poster presentation.
  11. \*Dong, C., Fu, S., Chew, B., Zhang, B., and T.W. Theunissen. A genome-wide CRISPR-Cas9 knockout screen identifies essential and growth-restricting genes in human trophoblast stem cells. *SRI Annual Meeting 2022*. Poster presentation.
  12. \*Karvas, R., Khan, S.A., Verma, S., Dietmann, S., Mysorekar, I., and T.W. Theunissen. Stem-cell-derived trophoblast organoids model human placental development and susceptibility to emerging viral infections. *SSR Annual Meeting 2022*. Oral presentation.
  13. \*Khan, S.A., Park, K., Karvas, R.M., Fischer, L.A., Dong, C., Lungjangwa, T., Jimenez, M., Casalena, D., Chew, B., Dietmann, S., Auld, D.S., Jaenisch, R., and T.W. Theunissen. Probing the signaling requirements for naïve pluripotency to build enhanced models of early human development. *Gordon Research Seminar on Mammalian Reproduction 2022*. Oral presentation.
  14. \*Karvas, R.M., Zemke, J.E., Ali, S.S., Sane, S., Dong, C., Fischer, L.A., Park, K., Upton, E., Wang, F., Park, K., Hao, S., Chew, B., Meyer, B., Zhou, C., Dietmann, S., and T.W. Theunissen. 3D-cultured human blastoids display hallmarks of early post-implantation development. *ISSCR Annual Meeting 2023*. Oral presentation.
  15. \*Karvas, R.M., Zemke, J.E., Ali, S.S., Sane, S., Dong, C., Fischer, L.A., Park, K., Upton, E., Wang, F., Park, K., Hao, S., Chew, B., Meyer, B., Zhou, C., Dietmann, S., and T.W. Theunissen. 3D-cultured human blastoids model trophoblast expansion, diversification, and invasion during early post-implantation development. *IFPA Annual Meeting 2023*. Oral presentation.
  16. \*Fischer, L.A., and T.W. Theunissen. Tracking and mitigating imprint erasure during induction of naïve human pluripotency. *ISSCR Annual Meeting 2024*. Oral presentation.
  17. \*Karvas, R.M., Zemke, J.E., Ali, S.S., Sane, S., Dong, C., Fischer, L.A., Park, K., Upton, E., Wang, F., Park, K., Hao, S., Chew, B., Meyer, B., Zhou, C., Dietmann, S., and T.W. Theunissen. 3D-cultured human blastoids model trophoblast expansion, diversification,

- and invasion during early post-implantation development. *SSR Annual Meeting 2024*. Oral presentation.
18. \*Zemke, J.E., Chapman, G., Fischer, L.A., Karvas, R.M., Park, K., Boggs, L., Meyer, B., Weng, K.C., Kroll, K.L., and **T.W. Theunissen**. Epigenome profiling reveals an essential role for Jun-N-Terminal kinase signaling during human trophoblast stem cell specification and differentiation into terminal lineages. *SSR Annual Meeting 2024*. Poster presentation.
  19. \*Khan, S.A., Ruhel, R., Fu, S., Ganguly, A., Kong, X., Chapman, G., Prakasam, R., Park, K.-M., Meyer, B., Chew, B., Kroll, K.L., McNeill, H., Zhang, B., and **T.W. Theunissen**. X-Chromosome state dynamics shape embryonic and extraembryonic fate from human naïve pluripotent stem cells. *SDB Annual Meeting 2026*. Oral presentation.
  20. \*Khan, S.A., Ruhel, R., Fu, S., Ganguly, A., Kong, X., Chapman, G., Prakasam, R., Park, K.-M., Meyer, B., Chew, B., Kroll, K.L., McNeill, H., Zhang, B., and **T.W. Theunissen**. X-Chromosome state dynamics shape embryonic and extraembryonic fate from human naïve pluripotent stem cells. *Gordon Research Conference on Mammalian Reproduction 2026*. Oral presentation.

#### **D. Commentaries on our Research:**

1. Gross, L. (2008). A shortcut to immortality: rapid reprogramming with tissue cells. *PLoS Biology* 6(10), e275.
2. Hanna, J.H. (2010). The STATs on naïve iPSC reprogramming. *Cell Stem Cell* 7, 274-275.
3. Huddleston, J.E. (2011). A new move for PRMT5. *Nat Rev Mol Cell Biol* 12, 76.
4. Jackson, S.A., and R. Sridharan (2013). The nexus of Tet1 and the pluripotency network. *Cell Stem Cell* 12, 387-388.
5. Sagi, I., and N. Benvenisty (2016). Stem cells: Aspiring to naivety. *Nature* 540, 211-212.
6. Lamas-Toranzo, I., Pericuesta, E., and P. Bermejo-Alvarez (2017). Memories of an X-chromosome. *Stem Cell Investig.* 4, 27.
7. Khan, S.A., P.N.C.B. Audergon, and B. Payer (2017). X-chromosome activity in naïve human pluripotent stem cells-are we there yet? *Stem Cell Investig.* 4, 54.
8. Pavlovich, M.J. (2022). Taking the guesswork out of journal submission with Community Review. *Cell Stem Cell* 29, 663-666.
9. Moinard, E., Pasque, V., and L. David (2023). Having a blast(oid): Modeling human embryo peri-implantation development with blastoids. *Cell Stem Cell* 30, 1125-1126.
10. Lefkopoulos, S. (2023). Extending blastoid potential. *Nature Cell Biology* 25, 1405.
11. De Los Angeles, A. (2025). Safeguarding genomic imprints in naïve human pluripotency. *Stem Cell Reports* 20, 102475.