



Brice Gaudilliere

Assistant Professor of Anesthesiology, Perioperative and Pain Medicine (Adult-MSD) and, by courtesy, of Pediatrics (Neonatology) at the Stanford University Medical Center

CLINICAL OFFICES

- **Anesthesia Department**

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Bio

BIO

Born in France, Dr. Gaudilliere studied Engineering at Ecole Polytechnique before completing an MD-PhD degree from the Harvard-MIT Health Sciences and Technology program. During his postdoctoral fellowship in Dr. Garry Nolan's laboratory (Stanford University), Dr. Gaudilliere developed and standardized a pipeline to implement high dimensional mass cytometry (a.k.a flow cytometry by time of flight mass spectrometry, or CyTOF) in clinical studies.

Dr. Gaudilliere's research group combines high parameter mass cytometry (suspension and imaging mass cytometry) with other proteomics approaches to study how the human immune system responds and adapts to physiological or pathological stressors. Ongoing studies in the Gaudilliere lab focus on several clinical scenarios including, 1) surgical recovery and traumatic injury, 2) pregnancy and preterm birth (in collaboration with the Bill and Melinda Gates and the March of Dimes foundation, 3) neurocognitive recovery after stroke.

Dr. Gaudilliere is also a Board-Certified Anesthesiologist and works clinically in the operating room 25% of his time.

CLINICAL FOCUS

- Anesthesia

ACADEMIC APPOINTMENTS

- Assistant Professor - Med Center Line, Anesthesiology, Perioperative and Pain Medicine
- Assistant Professor - Med Center Line (By courtesy), Pediatrics - Neonatal and Developmental Medicine
- Member, Maternal & Child Health Research Institute (MCHRI)

HONORS AND AWARDS

- Promise in biomedical research, Doris Duke Charitable Foundation (2017)
- Kozaka research award, International Anesthesia Research Society (2013)
- Stanford Society for Physician Scholar's award, SSPS (2011, 2012)

- Albert J. Ryan Fellowship, Harvard Medical School (2004)
- Carnot Foundation Scholarship, Ecole Polytechnique, Paris, France (2000)
- George Lurcy's Fellowship, Harvard University (2000)

PROFESSIONAL EDUCATION

- BS, Ecole Polytechnique , Engineering (2000)
- PhD, Harvard Medical School , Neurobiology (2005)
- Medical Education: Harvard Medical School (2009) MA
- Residency: Stanford University Anesthesiology Residency (2013) CA
- Board Certification: Anesthesia, American Board of Anesthesiology (2014)

PATENTS

- Brice Gaudilliere, Gabriela Fragiadakis, Martin Angst, Garry Nolan. "United States Patent S13-373 Flow cytometry methods for the diagnosis of prolonged convalescence after traumatic injury", Leland Stanford Junior University
- Azad Bonni, Aryaman Shalizi, Brice Gaudilliere. "United States Methods and compositions for modulating synapse formation", Harvard University

LINKS

- Gaudilliere Lab: <https://gaudillierelab.stanford.edu/>
- CyTOF at the bedside (4 minute video): <https://www.fluidigm.com/articles/immune-signatures-predict-surgery-recovery>
- ChildX2016 - An immune clock of pregnancy: <http://childx.stanford.edu/video/2016-conference/brice-gaudilliere-development-term>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The advent of high dimensional flow cytometry has revolutionized our ability to study and visualize the human immune system. Our group combines high parameter mass cytometry (a.k.a Cytometry by Time of Flight Mass Spectrometry, CyTOF), with advanced bio-computational methods to study how the human immune system responds and adapts to acute physiological perturbations. The laboratory currently focuses on two clinical scenarios: surgical trauma and pregnancy.

Deep immune profiling of patients undergoing and recovering from surgery: Using high dimensional mass cytometry, we have recently shown that the signaling behavior of specific innate immune cells measured before surgery in patients blood was strongly associated with surgical recovery. Prospective validation of reported immune correlates of surgical recovery are underway. Ongoing work in humans and animal models focuses on the mechanisms by which pre-operative habilitation interventions may alter a patient's immune state to improve recovery after surgery.

Deep Immune profiling of normal and preterm pregnancy: Our group is an integral component of a multi-disciplinary effort aiming at understanding the mechanisms of preterm birth, and identifying predictive factors of premature delivery. We have now developed a pipeline and the analytical framework to integrate the single-cell analysis of immune signaling networks by mass cytometry and proteomic profiling of secreted serum factors with the precise phenotyping of pregnancy-related clinical outcomes. In a pilot cross-sectional study of non-pregnant women, we identified candidate immune signatures that differentiated women with a history of preterm or term pregnancies. Longitudinal studies in pregnant patients are ongoing to validate these findings.

CLINICAL TRIALS

- Detection of Immune Changes as a Result of Surgical Trauma in Human Subject, Not Recruiting
- Immune-modulation Effects of an Arginine Rich Nutritional Supplement in Surgical Patients, Not Recruiting

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Dorien Feyaerts, Ina Stelzer, Franck Verdonk

Postdoctoral Research Mentor

Dorien Feyaerts, Kristen Rumer, Ina Stelzer, Franck Verdonk

Publications

PUBLICATIONS

- **Multionic immune clockworks of pregnancy.** *Seminars in immunopathology*
Peterson, L. S., Stelzer, I. A., Tsai, A. S., Ghaemi, M. S., Han, X., Ando, K., Winn, V. D., Martinez, N. R., Contrepolis, K., Moufarrej, M. N., Quake, S., Relman, D. A., Snyder, et al
2020
- **Discovery and validation of biomarkers to aid the development of safe and effective pain therapeutics: challenges and opportunities.** *Nature reviews. Neurology*
Davis, K. D., Aghaeepour, N., Ahn, A. H., Angst, M. S., Borsook, D., Brenton, A., Burczynski, M. E., Crean, C., Edwards, R., Gaudilliere, B., Hergenroeder, G. W., Iadarola, M. J., Iyengar, et al
2020
- **Differential Dynamics of the Maternal Immune System in Healthy Pregnancy and Preeclampsia** *FRONTIERS IN IMMUNOLOGY*
Han, X., Ghaemi, M. S., Ando, K., Peterson, L. S., Ganio, E. A., Tsai, A. S., Gaudilliere, D. K., Stelzer, I. A., Einhaus, J., Bertrand, B., Stanley, N., Culos, A., Tanada, et al
2019; 10
- **A year-long immune profile of the systemic response in acute stroke survivors.** *Brain : a journal of neurology*
Tsai, A. S., Berry, K., Beneyto, M. M., Gaudilliere, D., Ganio, E. A., Culos, A., Ghaemi, M. S., Choisy, B., Djebali, K., Einhaus, J. F., Bertrand, B., Tanada, A., Stanley, et al
2019
- **An immune clock of human pregnancy.** *Science immunology*
Aghaeepour, N., Ganio, E. A., Mcilwain, D., Tsai, A. S., Tingle, M., Van Gassen, S., Gaudilliere, D. K., Baca, Q., McNeil, L., Okada, R., Ghaemi, M. S., Furman, D., Wong, et al
2017; 2 (15)
- **Deep Immune Profiling of an Arginine-Enriched Nutritional Intervention in Patients Undergoing Surgery.** *Journal of immunology (Baltimore, Md. : 1950)*
Aghaeepour, N., Kin, C., Ganio, E. A., Jensen, K. P., Gaudilliere, D. K., Tingle, M., Tsai, A., Lancero, H. L., Choisy, B., McNeil, L. S., Okada, R., Shelton, A. A., Nolan, et al
2017
- **Mapping the Fetomaternal Peripheral Immune System at Term Pregnancy.** *Journal of immunology*
Fragiadakis, G. K., Baca, Q. J., Gherardini, P. F., Ganio, E. A., Gaudilliere, D. K., Tingle, M., Lancero, H. L., McNeil, L. S., Spitzer, M. H., Wong, R. J., Shaw, G. M., Darmstadt, G. L., Sylvester, et al
2016
- **Clinical recovery from surgery correlates with single-cell immune signatures.** *Science translational medicine*
Gaudilliere, B., Fragiadakis, G. K., Bruggner, R. V., Nicolau, M., Finck, R., Tingle, M., Silva, J., Ganio, E. A., Yeh, C. G., Maloney, W. J., Huddlestone, J. I., Goodman, S. B., Davis, et al
2014; 6 (255): 255ra131-?
- **Towards personalized medicine in maternal and child health: integrating biologic and social determinants.** *Pediatric research*
Stevenson, D. K., Wong, R. J., Aghaeepour, N., Maric, I., Angst, M. S., Contrepolis, K., Darmstadt, G. L., Druzin, M. L., Eisenberg, M. L., Gaudilliere, B., Gibbs, R. S., Gotlib, I. H., Gould, et al
2020

- **Changes in pregnancy-related serum biomarkers early in gestation are associated with later development of preeclampsia.** *PLoS one*
Hao, S., You, J., Chen, L., Zhao, H., Huang, Y., Zheng, L., Tian, L., Maric, I., Liu, X., Li, T., Bianco, Y. K., Winn, V. D., Aghaepour, et al
2020; 15 (3): e0230000
- **Cyt-Geist: Current and Future Challenges in Cytometry: Reports of the CYTO 2019 Conference Workshops.** *Cytometry. Part A : the journal of the International Society for Analytical Cytology*
Czechowska, K., Lannigan, J., Aghaepour, N., Back, J. B., Begum, J., Behbehani, G., Bispo, C., Bitoun, D., Fernandez, A. B., Boova, S. T., Brinkman, R. R., Ciccolella, C. O., Coteleur, et al
2019; 95 (12): 1236–74
- **CytoNorm: A Normalization Algorithm for Cytometry Data.** *Cytometry. Part A : the journal of the International Society for Analytical Cytology*
Van Gassen, S., Gaudilliere, B., Angst, M. S., Saeys, Y., Aghaepour, N.
2019
- **Guidelines for the use of flow cytometry and cell sorting in immunological studies (second edition).** *European journal of immunology*
Cossarizza, A., Chang, H., Radbruch, A., Acs, A., Adam, D., Adam-Klages, S., Agace, W. W., Aghaepour, N., Akdis, M., Allez, M., Almeida, L. N., Alvisi, G., Anderson, et al
2019; 49 (10): 1457–1973
- **A pilot study showing a stronger H1N1 influenza vaccination response during pregnancy in women who subsequently deliver preterm** *JOURNAL OF REPRODUCTIVE IMMUNOLOGY*
Andorf, S., Bhattacharya, S., Gaudilliere, B., Shaw, G. M., Stevenson, D. K., Butte, A. J., Sirota, M.
2019; 132: 16–20
- **How Clinical Flow Cytometry Rebooted Sepsis Immunology** *CYTOMETRY PART A*
Monneret, G., Gossez, M., Aghaepour, N., Gaudilliere, B., Venet, F.
2019; 95A (4): 431–41
- **Differential Dynamics of the Maternal Immune System in Healthy Pregnancy and Preeclampsia.**
Han, X., Ghaemi, M. S., Ando, K., Peterson, L., Ganio, E. A., Tsai, A. S., Gaudilliere, D., Einhaus, J., Tsai, E. S., Stanley, N. M., Culos, A., Taneda, A. H., Fallahzadeh, et al
SAGE PUBLICATIONS INC.2019: 271A
- **Multomics modeling of the immunome, transcriptome, microbiome, proteome and metabolome adaptations during human pregnancy** *BIOINFORMATICS*
Ghaemi, M., DiGiulio, D. B., Contrepois, K., Callahan, B., Ngo, T. M., Lee-McMullen, B., Lehallier, B., Robaczewska, A., Mcilwain, D., Rosenberg-Hasson, Y., Wong, R. J., Quaintance, C., Culos, et al
2019; 35 (1): 95–103
- **Predicting Acute Pain After Surgery: A Multivariate Analysis.** *Annals of surgery*
Baca, Q., Marti, F., Poblete, B., Gaudilliere, B., Aghaepour, N., Angst, M. S.
2019
- **Understanding health disparities.** *Journal of perinatology : official journal of the California Perinatal Association*
Stevenson, D. K., Wong, R. J., Aghaepour, N., Angst, M. S., Darmstadt, G. L., DiGiulio, D. B., Druzin, M. L., Gaudilliere, B., Gibbs, R. S., B Gould, J., Katz, M., Li, J., Moufarrej, et al
2018
- **GateFinder: Projection-based Gating Strategy Optimization for Flow and Mass Cytometry.** *Bioinformatics (Oxford, England)*
Aghaepour, N., Simonds, E. F., Knapp, D. J., Bruggner, R., Sachs, K., Culos, A., Gherardini, P. F., Samusik, N., Fragiadakis, G., Bendall, S., Gaudilliere, B., Angst, M. S., Eaves, et al
2018
- **Multicenter Systems Analysis of Human Blood Reveals Immature Neutrophils in Males and During Pregnancy.** *Journal of immunology*
Blazkova, J., Gupta, S., Liu, Y., Gaudilliere, B., Ganio, E. A., Bolen, C. R., Saar-Dover, R., Fragiadakis, G. K., Angst, M. S., Hasni, S., Aghaepour, N., Stevenson, D., Baldwin, et al
2017; 198 (6): 2479-2488
- **Expression of specific inflammasome gene modules stratifies older individuals into two extreme clinical and immunological states** *NATURE MEDICINE*
Furman, D., Chang, J., Lartigue, L., Bolen, C. R., Haddad, F., Gaudilliere, B., Ganio, E. A., Fragiadakis, G. K., Spitzer, M. H., Douchet, I., Daburon, S., Moreau, J., Nolan, et al
2017; 23 (2): 174-184

- **Deep Immune Profiling in Trauma and Sepsis: Flow Is the Way to Go!** *Critical care medicine*
Gaudilliere, B., Angst, M. S., Hotchkiss, R. S.
2017; 45 (9): 1577-78
- **Mass cytometry: The time to settle down.** *Cytometry. Part A : the journal of the International Society for Analytical Cytology*
Cosma, A., Nolan, G., Gaudilliere, B.
2017; 91 (1): 12-13
- **Freehand Versus Guided Surgery: Factors Influencing Accuracy of Dental Implant Placement.** *Implant dentistry*
Choi, W., Nguyen, B. C., Doan, A., Girod, S., Gaudilliere, B., Gaudilliere, D.
2017; 26 (4): 500-509
- **The road ahead: Implementing mass cytometry in clinical studies, one cell at a time.** *Cytometry. Part B, Clinical cytometry*
Baca, Q., Cosma, A., Nolan, G., Gaudilliere, B.
2017; 92 (1): 10-11
- **A Proteomic Clock of Human Pregnancy.** *American journal of obstetrics and gynecology*
Aghaeepour, N., Lehallier, B., Baca, Q., Ganio, E. A., Wong, R. J., Ghaemi, M. S., Culos, A., El-Sayed, Y. Y., Blumenfeld, Y. J., Druzin, M. L., Winn, V. D., Gibbs, R. S., Tibshirani, et al
2017
- **In Reply.** *Anesthesiology*
Angst, M. S., Fragiadakis, G. K., Gaudilliere, B., Aghaeepour, N., Nolan, G. P.
2016; 124 (6): 1414-1415
- **Patient-specific Immune States before Surgery Are Strong Correlates of Surgical Recovery** *ANESTHESIOLOGY*
Fragiadakis, G. K., Gaudilliere, B., Ganio, E. A., Aghaeepour, N., Tingle, M., Nolan, G. P., Angst, M. S.
2015; 123 (6): 1241-1255
- **Implementing Mass Cytometry at the Bedside to Study the Immunological Basis of Human Diseases: Distinctive Immune Features in Patients with a History of Term or Preterm Birth.** *Cytometry. Part A : the journal of the International Society for Analytical Cytology*
Gaudilliere, B., Ganio, E. A., Tingle, M., Lancero, H. L., Fragiadakis, G. K., Baca, Q. J., Aghaeepour, N., Wong, R. J., Quaintance, C., El-Sayed, Y. Y., Shaw, G. M., Lewis, D. B., Stevenson, et al
2015; 87 (9): 817-829
- **Transient partial permeabilization with saponin enables cellular barcoding prior to surface marker staining.** *Cytometry. Part A : the journal of the International Society for Analytical Cytology*
Behbehani, G. K., Thom, C., Zunder, E. R., Finck, R., Gaudilliere, B., Fragiadakis, G. K., Fantl, W. J., Nolan, G. P.
2014; 85 (12): 1011-1019
- **A FOXO-Pak1 transcriptional pathway controls neuronal polarity** *GENES & DEVELOPMENT*
de la Torre-Ubieta, L., Gaudilliere, B., Yang, Y., Ikeuchi, Y., Yamada, T., DiBacco, S., Stegmuller, J., Schueller, U., Salih, D. A., Rowitch, D., Brunet, A., Bonni, A.
2010; 24 (8): 799-813
- **PIASx is a MEF2 SUMO E3 ligase that promotes postsynaptic dendritic morphogenesis** *JOURNAL OF NEUROSCIENCE*
Shalizi, A., Bilimoria, P. M., Stegmuller, J., Gaudilliere, B., Yang, Y., Shuai, K., Bonni, A.
2007; 27 (37): 10037-10046
- **Transcription factor Sp4 regulates dendritic patterning during cerebellar maturation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Ramos, B., Gaudilliere, B., Bonni, A., Gill, G.
2007; 104 (23): 9882-9887
- **A calcium-regulated MEF2 sumoylation switch controls postsynaptic differentiation** *SCIENCE*
Shalizi, A., Gaudilliere, B., Yuan, Z. Q., Stegmuller, J., Shirogane, T., Ge, Q. Y., Tan, Y., Schulman, B., Harper, J. W., Bonni, A.
2006; 311 (5763): 1012-1017
- **A CaMKII-NeuroD signaling pathway specifies dendritic morphogenesis** *NEURON*
Gaudilliere, B., Konishi, Y., de la Iglesia, N., Yao, G. I., Bonni, A.

2004; 41 (2): 229-241

- **Characterization of a neurotrophin signaling mechanism that mediates neuron survival in a temporally specific pattern** *JOURNAL OF NEUROSCIENCE*
Shalizi, A., LEHTINEN, M., Gaudilliere, B., Donovan, N., Han, J. H., Konishi, Y., Bonni, A.
2003; 23 (19): 7326-7336
- **RNA interference reveals a requirement for myocyte enhancer factor 2A in activity-dependent neuronal survival** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Gaudilliere, B., Shi, Y., Bonni, A.
2002; 277 (48): 46442-46446