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**Research Objectives: *Mechanisms of cancer progression and metastasis.*** The overarching goal of my research program will be to understand the cellular and molecular mechanisms that regulate metastasis. I will particularly focus on metastasis initiation, and my research will emphasize the use of new single-cell genomics technologies to perform systems-level analyses of metastatic cells in patient-derived xenograft (PDX) cancer models. My research will combine discovery-based and hypothesis-driven approaches, with an ultimate goal of using insights gained to develop new biomarkers for early detection of metastatic cells, and identify new therapeutic strategies to prevent and treat metastatic disease.

**Education and Training**

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2009-present	<b>Postdoctoral Fellow</b>	<b>University of California, San Francisco (UCSF), Department of Anatomy</b> Advisor: Dr. Zena Werb, Ph.D., Professor and Chair, Department of Anatomy Project: Mechanisms of metastasis in Patient-derived Xenograft (PDX) models of human breast cancer UCSF Profile: <a href="http://profiles.ucsf.edu/devon.lawson">http://profiles.ucsf.edu/devon.lawson</a>
2002-2008	<b>Ph.D. Student</b>	<b>University of California, Los Angeles (UCLA), Department of Microbiology, Immunology, and Molecular Genetics</b> Advisor: Dr. Owen Witte, MD, Director, Eli & Edyth Broad Center of Regenerative Medicine & Stem Cell Research Dissertation: Identification and characterization of prostate stem cells
2002	<b>Research intern</b>	<b>Protein Design Labs (PDL) Biopharma, Fremont, CA Bioassay Development (Daclizumab/Zenapax)</b> Supervisor: Audi Daniels, Research Specialist Project: Optimization of ELISA assay to measure Daclizimab
1998-2002	<b>Undergraduate Student and Researcher</b>	<b>University of California, Davis (UC Davis)</b> B.S. Biological Sciences, emphasis in Genetics; Minor in Psychology Advisor: Dr. Wolf-Dietrich-Heyer, Ph.D., Professor and Chair, Department of Microbiology and Molecular Genetics Project: DNA damage repair pathways in <i>Saccharomyces cerevisiae</i>

## Publications

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### **In progress:**

1. **Lawson D.A.**, Bhakta N.R., Kessenbrock K., Prummel K., Yu Y., Takai K., Zhou A., Eyob H., Yaswen P., Goga A., Werb Z., Single-cell analysis reveals a stem cell program in human metastatic breast cancer cells. (*In press, Nature*)
2. **Lawson D.A.** \*, Kessenbrock K. \*, Werb Z., A single cell perspective on the cancer stem cell niche. (*Invited review, in progress, Nat. Cell Biol.*) \*equal contribution
3. Horiuchi D., Zhou A.Y., Corella A.N., Yau C., Balakrishnan S., Kessenbrock K., **Lawson D.A.**, Anderton B.N., Bazarov A.V., Eyob H., Yaswen P., McManus M.T, Rugo H., Werb Z., and Goga A., PIM kinase inhibition presents a novel targeted therapy against triple-negative breast tumors with elevated MYC expression. (*In revision, Nat. Med.*)
4. Sun Z., **Lawson D.A.**, Sinclair E., Wang C., Hetts S.W., Higashida R.T., Dowd C.F., Halbach V.V., Werb Z., Su H., Cooke D.L, Single-cell analysis identifies distinct subpopulations of endothelial cells isolated from human endovascular biopsy tissue. (*In press, Biotechnology Reports*)

### **Published:**

5. **Lawson D.A.**, Werb Z., Zong Y., Goldstein A.S., Witte O.N., The cleared mammary fat pad transplantation assay for mammary epithelial organogenesis, *Cold Spring Harb Protoc.*; Review. (*In press*)
6. Kessenbrock K.\*, Dijkgraaf G.J.\*, **Lawson D.A.**, Littlepage L.E., Shahi P., Pieper U., Werb Z., A novel role for matrix metalloproteinases in the regulation of mammary stem cells via the Wnt signaling pathway. *Cell Stem Cell*, 2013; 13:300-13 \*equal contribution  
Featured in: "Preview," *Cell Stem Cell*. 2013; 13:300; "Research Highlights," *Nat Cell Biol*. 2013; 15:1033.
7. Plaks V.\*, Brenot A.\*, **Lawson D.A.**, Linnemann J.R., Van Kappel E.C., Wong K.C., de Sauvage F., Klein O.D., Werb Z., LGR5-expressing cells are sufficient and necessary for postnatal mammary gland organogenesis. *Cell Rep.*, 2013 Jan 31;3(1):70-8. \*equal contribution  
Selected by *Cell Reports* as one of six best research reports of 2013
8. Jiao J., Hindoyan A., Wang S., Tran L.M., Goldstein A.S., **Lawson D.**, Chen D., Li Y., Guo C., Zhang B., Fazli L., Gleave M., Witte O.N., Garraway I.P., Wu H., Identification of CD166 as a surface marker for enriching prostate stem/progenitor and cancer initiating cells. *PLoS One*, 2012;7(8):e42564
9. Littlepage L.E., Adler S.E., Kouros-Mehr H., Huang G., Chou J., Korkola J.E., **Lawson D.A.**, Qu K., Xue Q., Sternlicht M.D., Krig S.R., Dijkgraaf G.J.P., Yaswen P., Collins C.C., Gray J.W., Chang H.W., Werb, Z., The transcription factor ZNF217 is a prognostic biomarker and therapeutic target during breast cancer progression, *Cancer Discov.*, 2012 Jul;2(7):638-51
10. Lukacs R.U., Goldstein A.S., **Lawson D.A.**, Cheng D., Witte O.N., Isolation, cultivation and characterization of adult murine prostate stem cells, *Nat Protoc.*, 2010 Apr;5(4):702-13
11. **Lawson D.A.**, Xin L, Goldstein A., Memarzadeh S., Zhong Y., Cheng D., and Witte O.N., Basal epithelial stem cells are efficient targets for prostate cancer initiation, *Proc Natl Acad Sci USA*, 2010 Feb 9;107(6):2610-5 (>140 citations)
12. Mulholland D., Xin L., Morim A., **Lawson D.**, Witte O.N., Wu H., Lin-Sca-1+CD49<sup>high</sup> Stem/progenitors are tumor initiating cells in the Pten-null prostate cancer model, *Cancer Res*, 2009; 69(22):8555-62.
13. Zong Y., Xin L., Goldstein A.S., **Lawson D.A.**, Teitell M.A., Witte O.N., ETS family transcription factors collaborate with alternative signaling pathways to induce carcinoma from adult murine prostate stem cells, *Proc Natl Acad Sci USA*, 2009 Jul 28;106(30):12465-70. doi: 10.1073

14. Lukacs R.U, **Lawson D.A.**, Xin L., Zong Y., Garraway I., Goldstein A.S., Memarzadeh S., Witte O.N., Epithelial stem cells of the prostate and their role in cancer progression, *Cold Spring Harb Symp Quant Biol.*, 2008;73:491-502; Review
15. Goldstein A., **Lawson D.A.**, Garraway I., Cheng D., Witte O.N., Trop2 identifies prostate stem cells with basal cell characteristics that can differentiate to produce basal, luminal, and neuroendocrine cells in vivo, *Proc Natl Acad Sci USA*, 2008; Dec 30; 105(52): 20882-7
16. **Lawson D.A.** and Witte O.N., Stem cells in prostate cancer initiation and progression, *J. Clin. Invest.*, 2007 Aug; 117(8):2044-50, Review (**>130 citations**)
17. Xin L., Lukacs R.U., **Lawson D.A.**, Donghui C., Witte O.N., Self-renewal and multilineage differentiation in vitro from murine prostate stem cells, *Stem cells*, 2007 Nov; 25(11): 2760-9
18. **Lawson D.A.**, Xin L., Lukacs R.U., Cheng D., Witte O.N., Isolation and functional characterization of murine prostate stem cells, *Proc Natl Acad Sci USA*, 2007 Jan 2;104(1):181-6 (**>230 citations**)
19. Xin L., Teitell M.A., **Lawson D.A.**, Kwon A., Mellinghoff I.K., Witte O.N., Progression of prostate cancer by synergy of AKT with genotropic and non-genotropic actions of the androgen receptor, *Proc Natl Acad Sci USA*, 2006 May 16;103(20):7789-94
20. Wang S., Garcia A.J., Wu M., **Lawson D.A.**, Witte O.N., Wu H., Pten deletion leads to the expansion of a prostatic stem/progenitor cell subpopulation and tumor initiation, *Proc Natl Acad Sci USA*, 2006 Jan 31;103(5):1480-5
21. Xin L.\*, **Lawson D.A.\* (co-first author)**, Witte O.N., The Sca-1 surface marker enriches for a prostate-regenerating cell subpopulation that can initiate prostate tumorigenesis, *Proc Natl Acad Sci USA*, 2005 May 10; 102(19):6942-7 \*equal contribution (**>340 citations**)
22. **Lawson D.A.**, Xin L., Lukacs R., Xu Q., Cheng D., Witte O.N., Prostate stem cells and prostate cancer, *Cold Spring Harbor Symp Quant Biol.*, 2005 70:187-96, Review

***In preparation:***

23. Takai K., **Lawson D.A.**, Littlepage L., Karpuj M., Kessenbrock K., Le A., Yu Y., Yu H., Weaver V.M., Werb Z., Deletion of DDR1 leads to basal, necrotic and aggressive breast cancer, (***In preparation***)

**Grants and Fellowships**

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**Active:**

2013-2017                      **R01 (PQC-4) grant**, NIH/NCI 1R01CA180039-01, (Werb, PI -10%) (207,500 annual direct), Lawson assisted Dr. Werb with proposal, which was based on Lawson's studies on metastasis using PDX models of human breast cancer.

**Completed:**

2011-2014                      **Postdoctoral Fellowship**, Department of Defense Breast Cancer Research Program, Award number W81XWH-11-1-0742 (\$300,000 direct for 3 years)

2007-2008                      **Graduate Student Fellowship**, UCLA Graduate Division Dissertation Year Fellowship

2004-2007                      **Graduate Student Fellowship**, Tumor cell biology, (National Institutes of Health/Public Health Services Grant T32 CA09056)

2004                              **Graduate Student Fellowship**, Cellular and Molecular Biology, (National Institutes of Health/Public Health Services Grant) (declined)

**Pending:**

2015-2018                      **K22 Career development award**, NIH/NCI (\$450,000 direct for 3 years if awarded)

## Invited Talks and Scientific Presentations

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- 2014 **Gordon Research Seminar/Conference, Mammary Gland Biology, Lucca, Italy**  
*Selected speaker (abstract award winner):* Single-cell analysis reveals a distinct stem cell program in early human metastatic breast cancer cells
- 2014 **Breast Oncology Program Annual Retreat, San Francisco, CA, USA**  
*Invited Speaker:* CDK Inhibition blocks metastatic progression in human Patient-Derived Xenograft (PDX) models of breast cancer
- 2013 **Beyond the Genome Meeting, San Francisco, CA, USA**  
*Invited Speaker:* Single-cell analysis reveals a distinct transcription program in human metastatic breast cancer cells
- 2012 **Northern California Cytometry Group Annual Meeting, San Francisco, CA, USA**  
*Invited Speaker:* From single cell sorting to analysis on the Biomark
- 2010 **Eli and Edyth Broad Center for Regenerative Medicine and Stem Cell Research Annual Tri-institution Retreat, Asilomar, CA, USA**  
*Invited speaker:* Mechanisms of Cellular Reprogramming by the Mammary Gland Microenvironment
- 2006 **International Society for Stem Cell Research 4<sup>th</sup> Annual Meeting, Toronto, Canada**  
*Selected speaker (abstract award winner):* Identification of the cell of origin of prostate cancer

## Memberships/Boards

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- 2010-present **UCSF Postdoctoral Scholars Association (PSA), Executive Officer**  
Society for promotion of science and career development for >1100 postdocs at UCSF. Activities: organized research seminar series, career development events, community outreach events (eg. Annual Bay Area Science Fair for school age children), and the Annual Postdoc Research Symposium
- 2012—present **UAW 5810, The Union for Postdocs at University of California, Lobbyist**  
Activities: Lobbied US Congress for increased science funding (2013); advocacy for *Research America* (My statement: <http://www.researchamerica.org/reasons>)
- 2010-present **UCSF Business Club, Member**
- 2005-present **American Association for Cancer Research (AACR); Associate Member**
- 2006-2009 **International Society for Stem Cell Research (ISSCR), Associate Member**

## Teaching and Mentoring Experience

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- 2014 **University of California, San Francisco (UCSF),** Research mentor for Katie Lee, Undergraduate student at University of California, Berkeley, Berkeley, CA
- 2013 **University of California, San Francisco (UCSF),** Masters thesis supervisor for Karin Prummel, University of Utrecht, Utrecht, The Netherlands
- 2009-2011 **University of California, San Francisco (UCSF),** Masters thesis co-supervisor for Aditi Sharma, California State University, Hayward (CSUH), Hayward CA
- 2005-2007 **University of California, Los Angeles (UCLA),** Research mentor, HHMI Precollege and Undergraduate Science Education Program, 2 students over 2 summers
- 2004-2006 **University of California, Los Angeles (UCLA),** Research mentor, Brentwood High School summer internship program, 2 students over 2 summers
- 2005 Spring quarter **University of California, Los Angeles (UCLA),** Teaching Assistant and lecturer for undergraduate course: Life Sciences 4 (LS4), Introduction to Genetics

2003 Winter quarter **University of California, Los Angeles (UCLA)**, Teaching Assistant and lecturer for undergraduate course: Life Sciences 4 (LS4), Introduction to Genetics

### Coursework and Special Training

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2012 **Course title: Biostatistics 187: Introduction to Statistical Theory and Practice**  
UCSF Department of Epidemiology & Biostatistics  
Instructor: Dr. Steven Paul, Ph.D., Principal Statistician, Office of Research

2011 **Course title: Idea to IPO and Beyond**  
UCSF Innovation, Technology, and Alliances  
Instructors: Steve Burrill, CEO of Burril & Company; Dr. Charles Craik, Professor, Departments of Pharmaceutical Chemistry, Pharmacology, and Biochemistry/Biophysics, UCSF

2011 **Course title: Pharm/Chem 152: Drug Discovery**  
UCSF Clinical and Translational Science Institute (CTSI)  
Instructor: Dr. Brian Shoichet, Professor, Department of Pharmaceutical Chemistry, UCSF

### References

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**Dr. Owen N Witte, MD**, Ph.D. Advisor  
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