

Eva Fast

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SKILLS:

Programming: Python, R/Bioconductor, MATLAB, Linux/UNIX, SQL (basic)

Tools: pandas, scikit-learn, matplotlib, Jupyter, Git, Dash, cummeRbund, Seurat, Scanpy, HOMER, bedtools

Statistics/Machine learning: Logistic/linear regression, clustering, dimensionality reduction (PCA, t-SNE)

EXPERIENCE:

Insight Data Science: *Health data fellow*

Jan 2019 - present

Boston, MA

- Generated tool that predicts personalized quality of life outcomes for potential kidney donors with the aim to increase organ donor recruitment
- Used linear regression modeling (lasso) and correlation analysis to identify 14 features out of an initial 200 that can predict quality of life score 34% better than random sampling
- Compared model against Random Forest regression, Random Forest classification and logistic regression and found equal or no improvement in performance
- Visualized results in an interactive web app (kidneypredict.me) using Dash and deployed with Heroku
- Project was selected and featured on the Insight blog <https://goo.gl/zqjwhQ>

Harvard University: *Postdoctoral Fellow*

Aug 2013 - present

Cambridge, MA

- Generated and analyzed 50+ genomics datasets (single cell RNA-seq, RNA-seq, ChIP-seq, ATAC-seq) using UNIX and R that showed novel, rapid molecular changes upon inflammatory stimulation
- Identified a novel subpopulation of long-term hematopoietic (blood) stem cells from single cell RNA-seq via graph-based clustering and developmental trajectory analysis
- Established *in vivo* mouse transplantation studies that identified intrinsic and extrinsic inflammatory regulators of hematopoietic stem cell function

Boston University: *Graduate research fellow*

Jan 2008 - July 2013

Boston, MA

- Adapted classification algorithms from remote sensing in custom MATLAB scripts to quantify bacterial concentration in fluorescent images, a tool which continued to be used by multiple members of the lab
- Showed that bacteria that target the stem cell niche can modulate host stem cell division (Fast EM et. al, Science 2011), results which are relevant for the control of infectious diseases

Dana-Farber Cancer Institute: *Research Intern*

July 2005 - Aug 2007

Boston, MA

- Executed glioblastoma tumor biology research using primary human samples in a mouse xenograft model with the goal to develop more effective cancer therapeutics

EDUCATION:

PhD in Biology, Boston University, MA 2007 - 2013
DI (FH) in Biotechnology, IMC University of Applied Sciences Krems, Austria 2002 - 2006
(US equivalent degree of BS/MS), thesis research at Dana Farber Cancer Institute in Boston, MA

PUBLICATIONS:

Fast EM, Sporrij A, Manning M, Yang S, Zhou Y, Guo J, Baryawno N, Zon LI. Identification of an endogenously activated long-term hematopoietic stem cell population. Manuscript in preparation

Lahvic JL, Ammerman M, Li P, Blair MC, Stillman ER, **Fast EM**, Robertson AL, Christodoulou C, Perlin JR, Yang S, Chiang N, Norris PC, Daily ML, Redfield SE, Chan IT, Chatrizeh M, Chase ME, Weis O, Zhou Y, Serhan CN, Zon LI. Specific oxylipins enhance vertebrate hematopoiesis via the receptor GPR132. *Proc Natl Acad Sci U S A*. 2018 Sep 11;115(37):9252-9257.

Simhadri RK, **Fast EM**, Guo R, Schultz MJ, Vaisman N, Ortiz L, Bybee J, Slatko BE, Frydman HM. The gut commensal Microbiome of *Drosophila melanogaster* is modified by the endosymbiont *Wolbachia*. *mSphere*. 2017 Sep 13;2(5)

Choudhuri A*, **Fast EM***, Zon LI. Using Zebrafish to Study Pathways that Regulate Hematopoietic Stem Cell Self-Renewal and Migration. *Stem Cell Reports*. 2017 Jun 6;8(6):1465-1471.

*equal contribution

Fast EM, Zon LI. Aging Hematopoietic Stem Cells Make Their History. *Dev Cell*. 2016 Nov 21;39(4):390-391.

Nasrallah R, **Fast EM**, Solaimani P, Knezevic K, Eliades A, Patel R, Thambyrajah R, Unnikrishnan A, Thoms J, Beck D, Vink CS, Smith A, Wong J, Shepherd M, Kent D, Roychoudhuri R, Paul F, Klippert J, Hammes A, Willnow T, Göttgens B, Dzierzak E, Zon LI, Lacaud G, Kouskoff V, Pimanda JE. Identification of novel regulators of developmental hematopoiesis using Endoglin regulatory elements as molecular probes. *Blood*. 2016 Oct 13;128(15):1928-1939.

Fast EM, Zon LI. Singling out blood development. *Nat Biotechnol*. 2015 Mar;33(3):260-1.

Hagedorn EJ, Durand EM, **Fast EM**, Zon LI. Getting more for your marrow: Boosting hematopoietic stem cell numbers with PGE2. *Exp Cell Res*. 2014 Dec 10;329(2):220-6.

Toomey M*, Panaram K*, **Fast EM**, Beatty C, Frydman HM, Evolutionarily conserved *Wolbachia*-intrinsic factors control differential stem cell niche tropism in the *Drosophila* ovary and enhance vertical transmission. *PNAS* 110 (2013) 10788-93. *equal contribution

Fast EM, Toomey ME, Panaram K, Desjardins D, Kolaczyk ED, Frydman HM, *Wolbachia* enhance *Drosophila* stem cell proliferation and target the germline stem cell niche. *Science* 334 (2011) 990-992.

Ziegler DS, Keating J, Kesari S, **Fast EM**, Zawel L, Ramakrishna N, Barnes J, Kieran MW, Veldhuijzen van Zanten SE, Kung AL, A small-molecule IAP inhibitor overcomes resistance to cytotoxic therapies in malignant gliomas in vitro and in vivo. *Neuro Oncol* 13 (2011) 820-829.

Chaponis D, Barnes JW, Dellagatta JL, Kesari S, **Fast E**, Sauvageot C, Panagrahay D, Greene ER, Ramakrishna N, Wen PY, Kung AL, Stiles C, Kieran MW, Lona-farnib (SCH66336) improves the activity of temozolomide and radiation for orthotopic malignant gliomas. *J Neurooncol* 104 (2011) 179-189.

Fu H, Cai J, Clevers H, **Fast E**, Gray S, Greenberg R, Jain MK, Ma Q, Qiu M, Rowitch DH, Taylor CM, Stiles CD, A genome-wide screen for spatially restricted expression patterns identifies transcription factors that regulate glial development. *J Neurosci* 29 (2009) 11399-11408.

HONOURS AND AWARDS:

- 08/2018 Merit based travel award for abstract submitted to International Society for Experimental Hematology (ISEH) Annual Meeting
- 12/2015 Abstract Achievement Award for abstract submitted to the 57th American Society of Hematology (ASH) Annual Meeting
- 10/2015 Alumni Award - Category: Special recognition in the field of research and academia, IMC University of applied sciences Krems, Austria
- 10/2014 Belamarich Award for outstanding doctoral dissertation in Biology, Boston University
- 05/2014 Selected Student Speaker at the annual Ph.D. Hooding Ceremony, Boston University
- 03/2014 Leukemia & Lymphoma Society (LLS) FELLOW Award (three year Postdoctoral Fellowship)
- 03/2014 Schroedinger three year Postdoctoral Fellowship, FWF (Austrian Science Fund), declined in favor of LLS award
- 12/2012 Austrian Scientists in Northern America (ASciNA) Award, Category: "Young Investigator", Austrian Federal Ministry of Science, Research and Economy
- 06/2010 1st prize for best student oral presentation at Sixth international *Wolbachia* conference
- 06/2006 graduated "with distinction" (=summa cum laude, highest mark) from IMC University of applied sciences Krems, Austria

SELECTED ORAL PRESENTATIONS:

- 08/2018 **Selected for oral presentation** at the International Society for Experimental Hematology (ISEH) Annual Meeting, Los Angeles California. Title: A Short Pulse of Prostaglandin E2 (PGE₂) affects long term clonal dynamics during hematopoietic stem cell transplantation
- 12/2015 **Selected for oral presentation** at the American Society of Hematology (ASH) Annual Meeting, Orlando Florida. Title: A short pulse of Prostaglandin E2 (PGE₂) induces long term chromatin changes in hematopoietic stem cells leading to increased self-renewal and engraftment
- 06/2015 **Selected for oral presentation** at the International Society for Stem Cell Research (ISSCR) Annual Meeting, Stockholm Sweden. Title: Reprogramming Short Term Blood Stem Cells to a Long Term Fate by Prostaglandin E2 (PGE₂)
- 03/2012 **Invited student keynote presentation** at 9th International Life Science Meeting. IMC FH KREMS. Title: *Wolbachia*-Host interaction: What intracellular bacteria can teach us about stem cell biology
- 06/2011 Abstract selected for **oral presentation** at seventeenth annual Boston Bacterial Meeting (BBM2011). Title: *Wolbachia* - stem cell niche interactions coordinate bacterial intracellular replication with niche differentiation.
- 06/2010 **Oral presentation** at the at Sixth international *Wolbachia* conference "Wolbachia On The Bay", Asilomar Conference Center, Asilomar, California USA. Title: *Wolbachia* promote stem cell division and display tropism for the germline stem cell niche *received award for best talk

TEACHING:

Guest lecturer

March 2012 – present

IMC - University of applied sciences Krems, Austria

Graduate Teaching Fellow

Fall 2007, Spring 2008

Undergraduate Laboratory Courses “Introductory Biology II” and “Systems Physiology”,
Boston University, Department of Biology

European-Voluntary-Service, Russia

Nov 2001 – June 2002

Voluntary work with youth and children in Samara, Russia

SERVICE:

President, Austrian scientists in America (ASCINA), Boston chapter

2010 - 2017

Coordination of monthly talks and social events. Liaison between official Austrian institutions
(e.g. Federal Ministries) and Austrian expatriate scientists in Boston.

Faculty Search Committee Member

2011

Neurobiology and Systems Biology Faculty Search, Department of Biology,
Boston University, Boston, MA