

# Rachael Bakker

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Evanston, IL

## EDUCATION

### PhD in Interdisciplinary Biological Sciences

#### Northwestern University, Evanston, IL

Dissertation: Analysis of Developmental Gene Regulation via Quantitative Imaging

Advisor: Richard Carthew, Professor, Molecular Biosciences

2013-2020

### Bachelor of Science Cum Laude

#### Western Washington University, Bellingham, WA

Major: Biology, Cell Emphasis Minor: Chemistry

Honors Thesis: Promoter deletion analysis of MUTE, a stomatal development gene in *Arabidopsis thaliana*

Advisor: Lynn Pillitteri, Professor, Biology

2007- 2011

## PUBLICATIONS

**Bakker R**, Mani M, Carthew RW. *The Wg and Dpp morphogens regulate gene expression by modulating the frequency of transcriptional bursts*. *Elife*. 2020 Jun 22; 9:e5607

Cassidy JJ., Bernasek SM, **Bakker R**, Giri R, Pelaez N, Eder B, Bobrowska A, Bagheri N, Nunes Amaral LA, Carthew RW. *Repressive Gene Regulation Synchronizes Development with Cellular Metabolism*. *Cell*, 2019 Aug 8; 178(4): 980-992

**Bakker R** & Carthew RW. *MicroRNAs Make a Difference in Cardiovascular Robustness*. (Commentary). *Developmental Cell*, 2017 Mar 27; 40(6): 515-516

Mahoney AK, Anderson EM, **Bakker RA**, Williams AF, Flood JJ, Sullivan KC, Pillitteri LJ. *Functional analysis of the Arabidopsis thaliana MUTE promoter reveals a regulatory region sufficient for stomatal - lineage expression*. *Planta*. 2016 Apr; 243 (4) : 987 - 98 .

Manuscript in review: Bernasek SM, Boisclair Lachance JF, Pelaez N, **Bakker R**, Navarro H, Nunes Amaral LA, Bagheri N, Rebay I, Carthew RW. *Ratio-based sensing of two transcription factors regulates the transit to differentiation*. bioRxiv 430744.

## RESEARCH EXPERIENCE

### Graduate Student Researcher, Lab of Richard Carthew PhD

#### Molecular Biosciences, Northwestern University

Sep 2013- Dec 2020

- Developed imaging techniques for single-cell quantification of gene expression in *Drosophila* imaginal discs. Studied mechanisms of regulation of transcriptional bursting. Analyzed role of miRNAs in developmental networks.
- Skills: in situ hybridization, immunofluorescence, QPCR, confocal microscopy, widefield microscopy, EM, RNA purification, tissue culture, genetics, Matlab, Python, R, SQL, machine learning for image analysis

- Supported by T32 Oncogenesis and Developmental Biology Training Grant

**Intern, Experimental Therapeutics,  
Seattle Genetics Inc, Bothell, WA**

May 2012-September 2012

- Characterization of the effects of antibody drug conjugates on human cancer cell lines, in vitro screening of human cancer cell lines for cell surface antigens, immunofluorescent microscopy of intracellular drug trafficking.
- Skills: immunofluorescence, flow cytometry, mammalian cell culture

**Research Assistant to Lynn Pillitteri PhD  
WWU Biology Department, Bellingham, WA**

March 2010-June 2011

- Map-based cloning of novel mutants identified in *Arabidopsis thaliana*, promoter deletion analysis of MUTE, a stomatal development gene in *Arabidopsis thaliana*.
- Skills: PCR, molecular biology
- Supported by WWU Undergraduate Research and Creative Activities Grant, Spring 2011

## CONFERENCE PRESENTATIONS

November 2018, Graduate Student Representative Panel Member for “Round Table Panel: Collaborating Across Disciplines.” NSF-Simons Center for Quantitative Biology Conference for Quantitative Approaches in Biology.

February 2018, Selected Poster: “Quantitating Expression Variability of Developmental Genes using smFISH.” Winter Q-Bio Conference.

June 2011, Poster: “Promoter deletion analysis of MUTE, a stomatal development gene in *Arabidopsis thaliana*.” WWU Scholars Week Poster Session

November 2012, Selected Poster. Seattle Genetics Science Day Research Symposium

## AWARDS

Northwestern University Interdisciplinary Biological Sciences Travel Grant - Winter 2018

Northwestern University The Graduate School Travel Grant - Winter 2018

Western Washington University Research and Creative Activities Grant, Spring 2011

## TEACHING

Graduate Teaching Assistant, Northwestern University: Genetics and Molecular Biology, Genetics and Molecular Biology Lab

Undergraduate Teaching Assistant, Western Washington University: Methods in Molecular Biology, Introduction to Cell Biology

## COMMUNITY & VOLUNTEER WORK

Science Fair Judge, Dawes Elementary, Evanston, IL. 2014

Volunteer, Clothes for Kids, Lynnwood WA, 2007-2013

Longtime volunteer for organization that provides low income K-12 students with free clothing for school. Procured over \$500 of donations for the Annual Celebrate the Children Charity Auction.