

Professional Development Report 2016–2018

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SECTION I: TEACHING

1. I taught one or more sections of Math 121, Math 122, Math 170, Math 290, Math 411/511, Math 417/517, Math 442/542, and Math 605. I placed instructional materials on my faculty webpage. In Math 411/511 (Complex Analysis) I proved the Prime Number Theorem.

SECTION II: RESEARCH AND SCHOLARSHIP

1. I took a sabbatical in Fall 2016 and conducted mathematical research into the Jacobian conjecture.

2. I wrote up the results of my sabbatical research in the form of a colloquium talk, with both slides and a 10 page narrative. (It has yet to be presented to the department.) In brief, I proved a theorem that gives rise to an infinite number of subtree-respecting linear orders of rooted planar trees, used this to find a non-symmetry-increasing partition of binary trees using a combinatorial technique called two-shuffling, and used one of the orderings combined with three-shuffling to reprove that $n = 3$, $k = 3$ case of the Jacobian conjecture in a much more efficient way than has been done before.

3. I gave the following two academic talks based on my expertise in discrete math:

Teaching Introduction to Mathematical Software Programming at Minnesota State University, Mankato, Spring Meeting of the North Central Section of the Mathematical Association of America, April 21, 2018.

Computing Graph and Group Automorphisms with Mathematica, Mathematics Colloquium, Department of Mathematics and Statistics, Minnesota State University, Mankato, October 5, 2017.

SECTION III: PROFESSIONAL DEVELOPMENT

1. I wrote a new set of notes for Math 290, Math 411/511, Math 417/517, and Math 442/542.

2. I taught Math 170 (Introduction to Mathematical Software Programming) without a textbook, and I designed labs and homework assignments for the course.

3. During a 3-credit release from teaching in Spring 2017 I designed many computer programming projects for Math 475/575: Advanced Mathematical Software programming.

SECTION IV: CONTRIBUTIONS TO STUDENT GROWTH AND DEVELOPMENT

1. I served on Russel Jahn's Masters Thesis committee and wrote him a letter of recommendation to accompany his applications to Ph.D. programs in Mathematics. The title of Russel's thesis is *A Pair of Measure Theoretic Proofs of the Prime Number Theorem*.

2. In Math 417/517 I discussed a variety of real analysis problems that have appeared on previous Master's Comprehensive Exams.

3. In Fall 2017 I gave a talk to the Math Club. Title: *Solving Quadratic Diophantine Equations*.

SECTION V: SERVICE TO THE UNIVERSITY AND ACADEMIC COMMUNITY

1. I wrote real analysis questions for the Masters Comprehensive Exam in academic years 2016/7 and 2017/8.

2. I served on the Promotion Committee for Dr. Han Wu in 2017/8.

3. I served on the Tenure and Promotion Committee for Dr. Brandon Rowekamp in 2017/18.

4. I served on the Real Analysis Search Committee in 2017/18.

5. I wrote a course proposal for Math 475/575: Advanced Mathematical Software Programming in Spring 2017. The course was approved by MnSCU in academic year 2017/8 and will be taught for the first time in Fall 2019.