

BYEONGSU YU

Texas A&M University - Department of Mathematics

@byeongsu.yu@tamu.edu

BLOC 506B

byeongsuyu.github.io

@yoo99101

EDUCATION

Ph.D. in Mathematics

Advisor: Dr. Laura Felicia Matusevich

Texas A&M University

May 2022(expected)

M.Sc. in Mathematics

Advisor: Dr. Woong Kook and Dr. Hyuk Kim (Co-advising)

Seoul National University

Aug 2017

B.B.A. in Business Administration

B.Sc. in Mathematics

B.A. in Philosophy

Yonsei University

Aug 2015

PUBLICATIONS

1. *A Generalization of the Ishida Complex with applications*

Laura Felicia Matusevich, Erika Ordog and **Byeongsu Yu**
Submitted



2. *Graded local cohomology of modules over semigroup rings*

Laura Felicia Matusevich and **Byeongsu Yu**
Submitted



3. *Shape-Preserving Dimensionality Reduction: An Algorithm and Measures of Topological Equivalence*

Byeongsu Yu and Kisung You
Submitted



4. *Standard pairs for monomial ideals in semigroup rings*

Laura Felicia Matusevich and **Byeongsu Yu**
J. Pure Appl. Algebra, Vol. 122, no. 9, pp.107036, 2022



5. *Standard pairs of monomial ideals over non-normal affine semigroups in SageMath*

Byeongsu Yu
J. Softw. Algebra Geom., Vol. 11, no.1, 11-1, pp.129–142, 2021



6. *A study on establishing legal causation of collective hazardous substances cases in a statistical viewpoint*

Dohyun Park and **Byeongsu Yu**
공익과 인권 (en: Public Interest and Human Rights), Vol. 15, pp. 209-261, 2015



SOFTWARE

1. *StdPairs: Library for symbolic computation over a monomial ideal of an affine (non-normal) semigroup with SageMath*

Byeongsu Yu



2. *TDakit: Toolkit for Topological Data Analysis with R*

Kisung You and **Byeongsu Yu**



TALKS AND PRESENTATIONS

POSTERS

When is \mathbb{Z}^d -graded modules of affine semigroup rings Cohen–Macaulay?

Comb., Comp., and Applied Algebraic Geometry 2022

U. of Washington, Seattle

Jun 2022



- When is the quotient of a semigroup ring by a monomial ideal Cohen–Macaulay?
 - Southwest Local Algebra Meeting 2022 Baylor University
 Feb 2022
 [↗](#)
- Standard pairs for monomial ideals in semigroup rings
 - Algebra, Geometry and Combinatorics Day - XVIII UIUC
 Mar 2020
 [↗](#)

TALKS

- > When is \mathbb{Z}^d -graded modules of affine semigroup rings Cohen–Macaulay?
 - Commutative Algebra seminar U. of Michigan. Sep 2022 [↗](#)
 - AMS Fall Sectional Meeting U. of Texas, El Paso. Sep 2022 [↗](#)
 - GradMoCCA U. of Minnesota, Twin Cities. Jun 2022 [↗](#)
 - CombinaTexas 2022 Texas A&M Univ. Mar 2022 [↗](#)
- > When is the quotient of a semigroup ring by a monomial ideal Cohen–Macaulay?
 - Graduate Algebra Symposium (Virtual) Nov 2021
 - KU Combinatorics Seminar The University of Kansas Apr 2021 [↗](#)
 - Algebra and Combinatorics Seminar Texas A&M Univ. Apr 2021
- > Contravariant functor appearing on monomial ideals of affine semigroup rings
 - Categories and Companions Symposium (Virtual) Jun 2021 [↗](#)
- > Monomial ideals in affine semigroup rings
 - CombinaTexas 2021 Texas A&M Univ. Feb 2021 [↗](#)
 - Graduate Algebra Symposium (Virtual) Oct 2020 [↗](#)
- > Universal Property via Yoneda Lemma
 - Graduate Student Seminar Texas A&M Univ. Nov 2019
- > Generalized Ishida Complex
 - Algebra and Combinatorics Seminar Texas A&M Univ. Nov 2019
- > Integrate $|xy(x+y)|$ over \mathbb{Z}_p with Haar measure
 - Gathering in Graduate Expository Mathematics (GIGEM) Texas A&M Univ. Feb 2019 [↗](#)
- > Topological Data Analysis on Single-Nucleotide Polymorphism data
 - Graduate Student Seminar Texas A&M Univ. Nov 2018
- > Effective Resistance Preserving Isomorphism
 - Graduate Student Seminar Texas A&M Univ. Oct 2017 [↗](#)

TEACHING & MENTORING

- > Explorations in Mathematics (MATH 167) – Instructor Texas A&M Univ. Fall 2020, Fall 2021, Spring 2022
 Gave lectures via face-to-face and online simultaneously, wrote lecture notes and 4 exams, wrote weekly quizzes, held weekly office hours.
- > Business Calculus (MATH 142) – Instructor Texas A&M Univ. Summer(1st) 2020, Spring 2020
 Gave lectures via face-to-face and online, wrote/graded 3 midterm exams and a final exam, wrote weekly quizzes, held weekly office hours.
- > AWM Peer Mentor Texas A&M Univ. Fall 2019 – present [↗](#)
 Peer-mentor for the first-year mathematics graduate students to help them adapt to new environment and responsibilities.
- > Directed Reading Program Mentor Texas A&M Univ. Spring 2020, Fall 2019 [↗](#)
 Discussed weekly with an undergraduate mentee to study mathematical topics outside of the undergraduate coursework.

- >
Engineering Calculus I/II (MATH 151/152)
- Teaching Assistant
📍 Texas A&M Univ.
📅 Summer(2nd) 2020, Fall 2019,
Summer(2nd) 2018, Summer 2021

Wrote/graded weekly Python lab assignments and solution sets, and weekly quizzes.
- >
Functions, Trigonometry and Linear Systems (MATH 150)
- Teaching Assistant
📍 Texas A&M Univ.
📅 Spring 2021, Spring 2019,
Fall 2018

Lead weekly recitation, wrote and graded biweekly quizzes.
- >
Engineering Mathematics III (MATH 251) & Business Calculus
(MATH 142) & Applied Algebra (MATH 433) - Grader
📍 Texas A&M Univ.
📅 Summer 2019, Summer(1st) 2018,
Spring 2018

Graded (bi)weekly assignments or quizzes.
- >
Linear Algebra (MATH 304/311/323) - Help Session
📍 Texas A&M Univ.
📅 Fall 2017

Tutoring undergraduate students about junior-level linear algebra courses.

SERVICE & OUTREACH

Student Working Seminar for Algebraic Statistics Organizer	📅 Fall 2021
CombinaTexas 2021 Session Chair	📅 Feb 20-21, 2021
Student Working Seminar for Algebra and Geometry CO-Organizer (w. Pablo Ocal)	📅 Fall 2020- Spring 2022 ↗
American Mathematical Society Graduate Student Chapter Vice Preseident	📅 Fall 2019 - Spring 2020
Student Working Seminar for Category Theory Organizer	📅 Summer 2019 - Fall 2019 ↗
CombinaTexas 2019 Session Moderator	📅 Mar 23, 2019
Integral Bee Volunteer	📅 Mar 26, 2018
STEMFest Volunteer	📅 Feb 3, 2018
High School Math Contest Volunteer	📅 Oct 21, 2017
Math Circle Volunteer	📅 Fall 2017 - Spring 2018

AWARDS & HONORS

- >
AMS Graduate student Travel Grant for 2022 AMS Fall Sectional Meeting
📅 Sep 2022

📍 American Mathematical Society
- >
Best Prize in Undergraduate Research
📅 Sep 2014

📍 Yonsei Univ. (Computational Science and Engineering)
- >
Award of Excellence in Economics Dissertation Contest
📅 Nov 2009

📍 Maeil Business Newspaper (Seoul, South Korea)

BUSINESS EXPERIENCE

- >
38 Securities – Intern
📍 Quincy, MA.
📅 Jan 2015 – Feb 2015
 Developing algorithmic option trading application using open C++ API from Interactive Brokers.
- >
Ars Praxia (former: TREUM) – Research Intern
📍 Seoul, Korea.
📅 Jan 2013 – Jul 2013
 Implemented a time-series analysis of a semantic network generated from 492,754 mentions on Twitter related to two elections, the Seoul city mayoral election of 2011 and the South Korean presidential election of 2012.
- >
17th Division, Republic of Korean Army – Sergeant
📍 Seoul, Korea.
📅 Feb 2011 – Nov 2012
 - Squad leader for the human resource department of the headquarters of the 307 th independent artillery battalion.
 - Reported the quinquennial financial status of the battalion for the financial audit of the Korean Army Headquarters.

LANGUAGES

English, Korean



LaTeX/TikZ



Python, SageMath, Macaulay2



C++

