

# Mathematical

# Sciences

UNIVERSITY OF MONTANA

SPRING 2015



## Q&A with Math Student Holt Bodish

By Kelly McKinnie



*Holt Bodish chilling outside the Math Building*

Mathematics major Holt Bodish is a 2014 Joseph Hashisaki Memorial Scholarship award winner. He graduated with a B.A. with High Honors in both Mathematics and Philosophy in May 2015. Holt has been an excellent student in the math department, and as with so many other mathematics majors, Holt is a musician. His band, **Mordecai**, formed in his hometown of Butte, MT,

has been featured in articles by the Boston Phoenix (Best New Montana Band of 2010 for the paper's annual "50 bands, 50 states" issue) and the Missoula Independent. In this Q&A Holt talks about his music and his math.

**Q:** How did you become interested in music?

**Holt:** I have been interested in music from a young age. Far before I learned that I had any interest in math, music and the arts were centerpieces of my life. I have my parents to thank for that. A lot of the music from the 1950's and 1960's cultural revolution in America played an important part in my formative years. I began playing guitar by learning Bob Dylan, Pete Seeger and other American-folk music songs. It took me many years to start to want to write my own music and then more time to be able to actually do it. I fall in and out of having a deep interest in music: sometimes I will go months without playing, though I'm always listening

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## Professor Toma Tonev 1945 – 2015



*Professor Toma Tonev*

As many of you already know, Professor Toma (Thomas) Tonev passed away on February 22; he had been on leave since late last fall. His obituary appeared in the Missoulian (you can search for it at [missoulian.com](http://missoulian.com)).

Toma earned his Ph.D. in 1973 at Moscow State University under the supervision of Evgeniy Alekseevich Gorin. He then spent 14 years at the Institute of Mathematics and Informatics of the Bulgarian Academy of Sciences. During this period he was also affiliated with the University of Sofia. After accepting a visiting position at the University of Toledo in 1989, he moved to the United States and joined the University of Montana in 1991.

Over the course of his career he had over 80 publications, which included two advanced monographs and a popular book. He was a prolific collaborator; his coauthors include, among many others, his wife Elena Toneva, a professor at Eastern Washington University, Professor Emeritus Keith Yale, and all of his 5 Ph.D. students: Dimcho Stankov (1984) and Maria Nisheva (1989) at Sofia University, and Scott Lambert (2008), Rebekah Yates (2009) and Jeffrey Johnson (2013) at UM. Here, he also had a special relationship with Aaron Luttmann, a 2006 Ph.D. student of Professors John Bardsley and Emily Stone.

Toma touched many people. At the celebration

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# Notes from the Chair

By Leonid Kalachev

My term as department chair is coming to an end on June 30, 2015. Emily Stone will be taking over as the new chair the next day. Thank you to all faculty members and staff for your support of my activities during the past six years. Without your hard work and constant involvement in the operations of the department, many of the ideas that were implemented and many positive developments that took place could not have been accomplished. I urge the entire department to give the new chair an even higher level of support.

The next academic year will be quite challenging for our program. With three faculty members (Eric Chesebro, Mark Kayll, and Kelly McKinnie) going on sabbatical, two faculty members having retired (Jim Hirstein and George McRae), one faculty member untimely passing away (Thomas Tonev), one leaving for a position at another university (Solomon Harrar) and one more taking a leave of absence (Jen Brooks), many groups will feel pressure in running the necessary classes and directing graduate students due to the lack of personnel.

Fred Peck, the new faculty member in Mathematics Education, will join the department in the fall. We welcome him to the University of Montana, and look forward to working with him in the years to come.

On behalf of all the faculty members and staff I relay greetings to our graduates who completed degrees during the 2014 – 2015 academic year. Two PhD students (one of them in the Individualized Interdisciplinary Studies Program), 7 MA students, and 30 Math Majors (one of them in Math / Computer Science) have successfully graduated during this year. Grant Swicegood, one of our most recent PhD recipients will stay

with the department during the next academic year as a lecturer postdoc.

The budget situation at the university has not improved; in fact, the situation became even worse compared to the last academic year. The budget cuts have affected our summer offerings: most of the classes can now only be taught by Teaching Assistants, for the purely financial reason that we cannot afford to hire permanent faculty members for the summer any more.

Our donors were extremely generous during the past semester; many of the donations came in memory of Professor Thomas Tonev. The department decided to start a memorial fund to commemorate our late professors. The money from this fund will be used to support our students; the details have not yet been determined. Thank you to our numerous supporters and donors on behalf of all faculty members and staff. Your generous contributions are even more important to us in the current environment of budget cuts and funding uncertainty.



They allow us to support necessary educational activities even when the university funds become scarce. Thank you very much!

To finish these “Notes from the Chair” and my term, I wish everyone a great summer! Next time the notes will be submitted by the new chair, Emily Stone, to whom I wish all the best in the important and challenging endeavor of running the Mathematical Sciences Department.

A handwritten signature in black ink, which appears to be 'Kalachev', written in a cursive style.



*Graduate Student Summer Research Award winners Nhan Nguyen, Cody Palmer, Charles Katerba and Ellie Bayat-Mokhtari.*

# Professor Tonev's Mathematical Family

The Mathematics Genealogy website (<http://genealogy.math.ndsu.nodak.edu>) says that Thomas Tonev had 5 Ph.D. students ("mathematical children") and no "mathematical grandchildren." My name isn't on that list – I earned my Ph.D. in 2006 under the supervision of Professors John Bardsley and Emily Stone. But Prof. Tonev had a career-altering impact on my professional life, as he did on the lives of many students beyond those whose Ph.D.s he directed.

My first year at the University of Montana I had a pretty regular relationship with Prof. Tonev, as a student in his Functional Analysis and Banach Algebras courses. (All of us students who did research with him called him Professor Tonev – never Thomas or Toma. That wasn't because he didn't allow it, but rather because we were all at least a little bit in awe of him and couldn't imagine speaking to him informally.) I went to class, did the homework, and sometimes went to office hours – pretty normal stuff. Then, on the last day of class in Banach Algebras, at the end of my first year at the University of Montana, Prof. Tonev did something that no other professor had ever done to me before nor would do again ... he gave me homework for the summer! One could imagine that being a professor's way of telling me my performance in his class left a lot to be desired, but that was Prof. Tonev's way of inviting me to do research with him.

I actually did that summer homework – which was to read and digest some recent research on function algebras – and that established me as the first student in the new mathematical family that Prof. Tonev was starting. Scott Lambert quickly joined the group, and the three of us started meeting regularly so that Scott and I could get up to speed on the theory of function algebras. Prof. Tonev was full of research ideas, and he had an impeccable knack for breaking large problems down into smaller pieces that we students could digest, large theorems into smaller lemmas that we were capable of proving. My summer homework

assignment led to my first mathematical publication, and Prof. Tonev went to great pains to teach me how to write abstract mathematics. When he rewrote the entire first draft of our paper, he also took the time to teach me why he was making the changes he was. Teaching us to write mathematics was probably one of the greatest gifts he passed on to his students.

Prof. Tonev really got energized about working with students again, and he was always excited to hear that more and more students – even at other universities – were starting to work on problems related to his

research. He was particularly pleased to meet Kristopher Lee at the 5th Conference on Function Spaces at SIUE, in the spring of 2010. Kris was a graduate student at Clarkson University, where I had become an assistant professor. The Clarkson math department focused solely on applied mathematics, but Kris wanted to study analysis. Prof. Tonev had supplied such a long list of research problems for us that we had no trouble finding interesting challenges for Kris to work on. In 2012 Kris graduated from Clarkson with a Ph.D., his thesis topic coming directly from Prof. Tonev. At least unofficially, Kris was Prof. Tonev's first mathematical grandchild!

Prof. Tonev taught me how to be a functional analyst and how to be an evangelist

for analysis. Though he never told me explicitly, I've always believed that his recruiting me was the first step in a concerted effort to pass on his love for functional analysis to a new generation and to have that propagate to generations beyond. Beyond his 5 Ph.D. students, his adoption of me, and his work being passed on to Kris Lee, I know of 5 more students who are currently pursuing Ph.D.s in mathematics after starting their research careers as undergraduates working on problems inspired by Prof. Tonev. He didn't know most of them personally, but he knew of them and was proud to see his legacy grow. I am proud to be a part of that legacy and proud to be able to continue the work he started.



*Aaron Luttmann, Toma Tonev and Scott Lambert on an outing from Banach Algebras 2007 at the University of Québec*

# Spring 2015 Scholarship and Award Winners

## **Joseph Hashisaki Memorial Scholarship**

Johnathan Bush

## **Anderson Mathematics Scholarship**

Andrea Johnson

## **The Adams Scholarships**

*Junior:* Adam Clemons

*Senior:* Jessica Hurd

## **Mac Johnson Family Scholarships**

Shelby Frazier      Brett Kassner

Cody Sevier

## **Merle Manis Award**

Jennifer Nelson

## **John A. Peterson Awards for Mathematics Education**

Gregory Bohun      Cristine Boles

Nicole Kelly

## **Undergraduate Teaching Scholars**

Johnathan Bush      Jessica Hurd

Brett Kassner

## **Undergraduate Tutorial Scholars**

Shelby Frazier      Katerina N. Hall

Darby A. Henderson      Payton Pietron

Benjamin Stark

## **N.J. Lennes Competition**

*1st place:* Emily Graham

*2nd place:* Daniel Lande

Gilia Patterson

Patrick Tresslar

## **Carolyn and Johnny Lott Elementary Education Scholarship**

Ann Updike

## **William Myers**

## **Mathematics Scholarship**

Kevin Joyce

## **Graduate Student Distinguished Teaching Awards**

Lyric Liu      Cody Palmer

## **Graduate Student Summer Research Awards**

Ellie Bayat-Mokhtari      Charles Katerba

Omid Khormali

Nhan Nguyen

Cody Palmer

## **President's Senior Recognition Awards**

Holt Bodish

Cristine Boles

Matt Detrick

Geoffrey Glidewell

Nicole Kelly

Levi Kindred

Tyrell McPherson

JonAlan Osborne

## Honor Roll of Donors

Duane Adams

Anonymous Donor

Lee Ballard

Loren Doyle and Linda Baugher

Anthony Beltramo

Mary Boettcher

Ruth Brocklebank

Rodney and Mary Jean Brod

Charles and Cynthia Bryan

Katrina Cadrin

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Jeffry and Libby Goldes

Miguel Gomez

Stanley Grossman

Francis Hannick

Eric Hartse

Mary Hashisaki

Gloria Hewitt

Gregory and Sydney Hulla

Anne Johnston

Lawrence and Charlotte Kaber

Herbert Kasube

Johnny and Carolyn Lott

Rustem and Minkie Medora

Stephen Mihina

Bruce and M. Sandra Mueller

Frank and Darlene Nelson

Robert O'Donnell

Jeffery Padgett and

Catherine Stewart

Suzanne Plummer

PNC Foundation Matching  
Gift Program

Howard and C.W. Reinhardt

David Sherry and

Jeanne Ambruster Sherry

Goang and Huey-Fen Shiue

Helen Simon

Gregory and Janice St. George

Elsie Taylor

Elena Toneva and Thomas Tonev

R. Lynn Turnquist

George Votruba and Peggy Strong

Vanguard Charitable

Endowment Program

Regina Souza and

Nikolaus Vonessen

Richard and Carla Welter

Dennis White

Michelle Wieler

Rebekah Yates

### Professor Tonev, continued from page 1.

of his life on March 14 in the President's Room in Brantly Hall, there was standing room only, and many of the participants spoke about the impact he had made on their lives. Following, we present memories of his three Ph.D. students at UM. There is also a longer article by Aaron Luttman on page 3.

N.V.

**Scott Lambert** (Assistant Professor at Husson University in Bangor, Maine): When I started my graduate studies at University of Montana, Professor Tonev was one of my first professors. His classes were well prepared and still contained a dynamic element that made me feel like it was happening "live" right in front of me. He responded to questions and happily adapted his approach to feedback from the class. I knew right away that I wanted to work with him. Outside of class, I was cautious in approaching him, but for no good reason; he always seemed delighted to talk to me and discuss any ideas I had. And then he agreed to be my advisor. He became much more than that – a mentor and ... friend? No, I was always in such awe of him that that isn't right. He was the kindest father-figure I could have imagined. He never scolded even when I deserved it. It seems he had no need of negativity (an example I aspire to when my own students frustrate me). He would take a few of us to conferences. He introduced us to the community and customs of mathematical research. He fostered my growth so casually that I hardly knew it was occurring.

Professor Tonev was always fully engaged – up for a social gathering or a bit of mathematical advice. He never tried to intimidate us with mathematics way beyond us, but found interesting puzzlers that encouraged us to dig deeper. He was generous with his assistance, which only inspired us to take things further on our own.

In the years since graduating, he was always there with a letter of recommendation and we exchanged a few updates, but I wish I had told him how I felt – that I recognized how much he had shaped me.

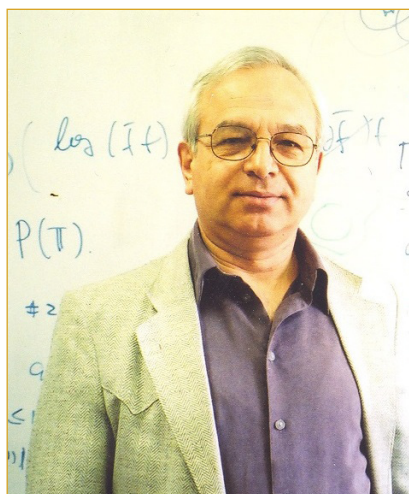
**Rebekah Yates** (Assistant Professor at Houghton College in Houghton, NY): As an intimidated first semester graduate student, I took a course from Professor Tonev. The official class start time was 3 PM, and it was supposed to end at 3:50. Almost every day, Prof. Tonev started class by 2:55, and around 3:50, he would often say, "in two words," and then proceed with another ten minutes or so of lecturing. Prof. Tonev was so engrossed

in his material and so dedicated to making sure that students got everything he could give them out of the class that he gave us extra time every day. While I didn't always appreciate that in my first semester, as a professor myself now, I hope to be as dedicated as he was. Another of my enduring memories of Prof. Tonev occurred in another one of his classes, when he started class and lectured for at least half an hour, then paused for a brief moment, turned to us and declared that he had made an error and he wasn't seeing it instantly, so he needed to go to his office to get his notes, which he had forgotten that day. I was, and remain, very impressed with the length of time he had been without notes at all.

When I finished that first class with Prof. Tonev, I thought I was done with analysis and completed my master's in algebra. I ended up taking a topology class with Prof. Tonev in my second year and rediscovered my love for analysis through that course and through talking with some of his other students. At the end of my second year, I found myself asking Prof. Tonev if he would be my advisor for my PhD. He graciously agreed, and he proved to be an incredibly encouraging and supportive advisor throughout the rest of my time at UM and beyond.

Prof. Tonev cared deeply about his students as whole people, not just mathematicians. He made sure to ask about my husband and family members far away, he took more than one of my classes out to dinner during the semester, and he asked us about our lives beyond the mathematics we were doing with him. He also worked hard to help us develop as mathematicians, introducing us to others in our field, encouraging us to present at conferences, and writing papers with us as early in our graduate careers as he could convince us to do so. I will always be grateful for his care for me and for all of his students, and hope to honor his memory by caring deeply for my students as well.

**Jeffrey Johnson** (Assistant Professor at the American University in Cairo, Egypt): Perhaps it goes without saying how great an impact Dr. Tonev had on my life. I would not be where I am today, and my family would not be where they are if it was not for his help. I will always be grateful for the wisdom Dr. Tonev shared with me while working in Missoula. Mostly I admired the kind gentle respect he showed me, especially in times when I struggled with the duties of school and family. He was an amazing teacher and advisor, but he was also patient, kind, and offered me an opportunity when others did not. We talked about family, culture and language just as much as math, and I'm glad we did. I wish his lovely family all the best.



# Degree Recipients 2014-15

## Bachelor Degrees

Mary Elizabeth Bennett	Cole Four Bear	Levi Kindred	Jesse Robins
Holt Bodish	Geoffrey Glidewell	Jonathon Knudson	Katie Roskilly
Gregory M. Bohun	Alyssa A. Griner	Daniel Ross Lande	Aaron St. George
Cristine Boles	Erica Kyong Hansen	Tyrell Thomas McPherson	Austin Thomas
Olivia Margaret Calabrese	Matthew Hanson	JonAlan J. Osborne	Phoebe Webb
Matthew T. Detrick	Samson Alexander Johnson	Samuel Parke	Jasmin York
Seth Donahue	Nicole Skye Kelly	Kyle James Pierce	
Jay Maxwell Egenhoff	Sara Nicole Killeen	Cory C. Raeth	

## Master's Degrees

Joshua P. Byrnes	Michael Grilli	Michael Phillips	Caitlin Nicole Swift
Tek Bahadur Chhetri	Lyric Yang Liu	Denis Shchepakina	

## Doctoral Degrees

Grant Swicegood - Advisor: Jim Hirstein

Meredith Kay Berthelson - Advisor: Ke Wu

### Holt Bodish, continued from page 1.

to music. This is probably a reflection on the interest in math, philosophy, and literature that I have gained in college. Sometimes the force of music and art can seem trivial. Though that may be more a reflection of what we value culturally than what I actually take seriously.

**Q:** How did you become interested in math?

**Holt:** I was late to the math game. High school math classes always seemed so trivial so I never paid much attention. I could get the work done in the few minutes that they gave at the end of class to work. I knew that I had some kind of aptitude for the subject but wasn't even sure what the subject was. I didn't take a calculus class until my first semester of college. There I learned that I had poor algebra skills (developed from doing little work in high school) but conceptually the material was accessible. Having a brother that was inspired by the subject helped me to continue in the direction of learning math though I wasn't quite sure that was what I wanted to do. Teetering on the edge of an art program or a philosophy program I decided to continue studying math. The choice was a fantastic one. The second semester of college I found myself in Eric Chesebro's Honors Calculus II class and thought it was a lovely subject by the end of that semester. Part of this was being exposed to some topology in what became an undergraduate research program with Eric as a faculty mentor. Topology seemed to embody what I liked most about art, visualization and imagination, and philosophy, the search for ever more general spaces on which to do calculus.

**Q:** We hear that you play with your brother, **Elijah Bodish**, a former UM math major who graduated

in 2011 (also with high honors). Did he influence you in your choices of both music and math?

**Holt:** Elijah certainly influenced me in my decision to do math. Mostly by pushing me to take classes in the subject. He went through the Math Education program and his experiences in the high school classroom also influenced my decision to pursue the pure math line. It is a fantastic opportunity to have a subject (math) in which we both have knowledge and can discuss. Music for both of us developed in tandem. Elijah, at the point when we started playing music, was more dedicated to math than music and I, being in high school, was more dedicated to music than math. The equilibrium has continued to be this way and we feed off the energy of each other.

**Q:** What is hard about working with your brother?

**Holt:** Most of the problems of working with siblings were worked out for us in the beginning. We had many hours of bickering and disagreements and shouting matches. Luckily we seem to have gotten these out of the way (for the most part). It's actually much easier to work with someone who shares a similar aesthetic and who you know very well than to work with a stranger.

**Q:** There is a lot written about the connection between mathematics and music. Do you feel the connection in your own work? Do you find yourself contemplating the similarities or do you wish to keep those two parts of your life separate?

**Holt:** For me I contemplate the similarities very rarely. The kind of music that Elijah and I make and the way we approach it seems to be the polar opposite of

**Continued on page 7.**

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**Endowed Scholarship Funds:** *The Adams Scholarships, Anderson Mathematics Scholarship, Joseph Hashisaki Memorial Scholarship, Mac Johnson Family Scholarships, Merle Manis Award, William Myers Mathematics Scholarship*

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### Holt Bodish, continued from page 6.

the way we approach solving a math problem. I think there is irrationality and disorder in the mind that needs expression. I find that it is helpful to me to not chart it, or lasso it, but instead to let it out unfiltered. I always think much clearer after a loud practice that didn't engage any of my overtly rational capacities than after a structured attempt at playing music. There needs to be a balance.

**Q:** What do you plan to do after graduating from UM?

**Holt:** I plan on moving back to Butte, study for the GRE, read math books, and read literature. I have a summer job watering petunias and pansies which gives me free time to explore these pursuits. I also

hope to spend more time playing and recording music than I have over the last four years.

**Q:** We hear your music has quite a following! What is the most exciting place you have toured? Where's your favorite place to play your music?

**Holt:** The most exciting place we played was definitely NYC. Mostly because of the amount of people that were there and because of the feeling that it still means something to play in the city that has fostered culture for at least a century. My favorite place to play my music is in Butte. There is a quiet freedom there that I think is channeled into the music I like to make.



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## Seth Braver Wins MAA Beckenbach Book Prize

At the Joint Mathematics Meetings this January in San Antonio, former graduate student Seth Braver was honored by the Mathematical Association of America with the Beckenbach Book Prize, which recognizes authors of distinguished, innovative books published by the MAA. Seth's book, *Lobachevski Illuminated*, is based on his Ph.D. thesis which he completed in 2007 under the direction of Greg St. George and Karel Stroethoff. While you can find out more about this interesting work in our *Fall 2011 newsletter*, I thought you might enjoy hearing a bit from Seth in his own words (quoted from the JMM Prizes and Awards booklet):

**Biographical Note:** The peculiar experiences of Seth Braver in academia include exposing the then-president of the Greek Academy as a plagiarist and being fired twice for heresy—first from a community college for laughing openly at the graphing calculator bandwagon, then from a “Great Books” college for (among other sins) proclaiming *Tristram Shandy* a more profound book than *Nicomachean Ethics*. In addition to *Lobachevski Illuminated*, he has published *Ill Enough*

*Alone* (White Violet, Hemet, CA, 2014), a volume of poetry. He lives in Olympia, Washington.

**Response from Seth Braver [to the award citation]:** To receive, in 2015, a prize for a book that was published in 2011, submitted for publication in 2009, written in 2005–06, and conceived in 2003, is more than a bit disorienting.

I feel I am accepting this prize on behalf of an old friend now deceased. Winning this prize would not have surprised him, convinced as he was of his book's many merits. It surprises me, however, well aware as I am of *Lobachevski Illuminated's* many failings. Thank you—from both of us.



*Seth Braver, pointing out unexpected connections*

