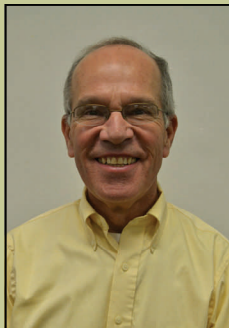


## Faculty and Staff



**Dr. Jerry Artz**  
**Professor, Radiation Safety Officer,  
 MIAC Faculty Rep.**  
 \*University of Cincinnati B.S.  
 \*Stanford University M.S.  
 \*Florida State University Ph.D.  
**Contact:** (651) 523-2256  
 jartz@hamline.edu

**Research interests:** nuclear physics and energy; alternate energy resources; energy policy; physics of the environment; radiation safety.

**Personal interests:** tennis; music; the arts.



**Dr. Bruce Bolon**  
**Associate Professor, Chair**  
 \*Southwest Missouri State University B.S.  
 \*Iowa State University M.S.  
 \*University of Missouri-Columbia Ph.D.  
**Contact:** (651) 523-2192  
 bbolon@hamline.edu

**Research interests:** magnetic properties of multilayered thin films; determining the suitability of various materials for potential use in spintronic devices.

**Personal interests:** Playing, writing & listening to music; baseball; high fantasy books; playing cards (esp. spades); Dungeons & Dragons; playing racquetball.



**Dr. Lifeng Dong**  
**Emma K. and Carl R. N. Malmstrom  
 Endowed Chair in Physics**  
 \*Qingdao University of Science and Technology B.S., M.S.  
 \*Portland State University M.S., Ph.D.  
**Contact:** (651) 523-2634  
 ldong03@hamline.edu

**Research interests:** nanostructured materials; nanoscale devices (i.e., solar cells, supercapacitors, batteries, fuel cells, field effect transistors, and biosensors)

**Personal interests:** swimming, tennis, reading



**Dr. Benjamin Gold**  
**Laboratory Coordinator**  
 \*Michigan State University B.S.  
 \*University of California, Davis Ph.D.  
**Contact:** (651) 523-3056  
 bgold01@hamline.edu

**Research interests:** cosmology; statistics & data analysis; early universe physics

**Personal interests:** electronic music; games with my daughter

## Faculty and Staff



**Dr. Andy Rundquist**  
**Professor, Administrative Head**  
 \*Saint John's University (MN) B.A.  
 \*Washington State University M.S., Ph.D.  
**Contact:** (651) 252-1778  
 arundquist@hamline.edu

**Research interests:** ultrafast optical pulse generation, characterization, and optimization; next-generation particle accelerators; modeling.

**Personal interests:** jazz trombone; guitar; disc golf; playing with his 3 boys.



**Dr. Kevin Stanley**  
**Visiting Assistant Professor**  
 \*University of Idaho B.S.  
 \*Clemson University M.S.  
 \*Iowa State University Ph.D.

**Contact:** (651) 523-3060  
 mstanley01@hamline.edu

**Research interests:** condensed matter physics; quantum mechanical effects in surface physics; field emission.

**Personal interests:** Magic: The Gathering; strategic board (and computer) games.



**Dr. Richard Pontinen**  
**Emeritus Professor of Physics**  
 \*Hamline University B.A.  
 \*University of Minnesota PhD

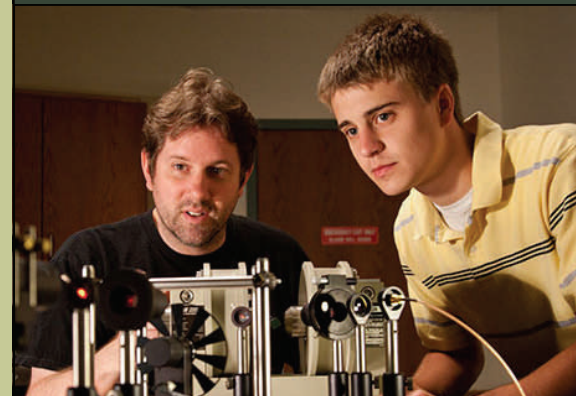
**Personal interests:** golf in the spring, golf in the summer, golf in the fall, and, of course, golf in the winter.

Dr. Pontinen maintains strong ties to the physics department and the university as a whole. The scholarship he generously established continues to provide funding for several students each year.

## What are some of our graduates doing now?

- Industry (3M, Honeywell, Seagate, etc.)
- Graduate School in Physics or Engineering
- Law School (e.g. Patent Law)
- Medical School

# Physics at Hamline University



## Contact Information

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 1536 Hewitt Avenue  
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 651-523-2800

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 MS-B1807  
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**http://www.hamline.edu/cla/physics/**

*Last Revised: Fall 2015*

## Physics Degree Options

corresponding to the 2014-2015 Bulletin  
(please refer to bulletin in case of changes)

### Bachelor of Science (BS) Degree

This major is intended for students planning to proceed to graduate work in either physics or engineering. It focuses on both high-level physics courses and providing a breadth of science education. It is a total of 70 credits (19 courses)

#### 1. Physics courses (34 credits)

PHYS 1230 General Physics I  
PHYS 1240 General Physics II  
PHYS 3540 Modern Physics  
PHYS 3600 Mathematical and Computational Methods  
For Physicists and Engineers  
PHYS 5900 Junior Seminar (2 semesters)  
PHYS 5910 Senior Seminar (2 semesters)  
PHYS 5920 Research Project-Based Advanced  
Laboratory (2 semesters)  
PHYS 5930 Theoretical Mechanics  
PHYS 5940 Advanced Electromagnetic Field Theory  
PHYS 5950 Advanced Quantum Mechanics

#### 2. Courses outside physics (16 credits)

MATH 1170 Calculus I  
MATH 1180 Calculus II  
MATH 3320 Multivariable and Vector Calculus  
MATH 3720 Differential Equations

#### 3. Advanced electives (choose 3, one of which must have a lab) (12 credits)

PHYS 3520 Physical Optics (with lab)  
PHYS 3700 Condensed Matter Physics  
PHYS 3750 Thermodynamics and Statistical Mechanics  
PHYS 3800 Electronics and Instrumentation (with lab)  
PHYS 5955 Advanced Topics in Physics

#### 4. Science electives (choose 2) (8 credits)

BIOL 1800 Principles of Ecology and Evolution  
BIOL 1820 Principles of Plant and Animal Physiology  
BIOL 3050 Principles of Genetics  
BIOL 3060 Principles of Cell Biology  
CHEM 1130 General Chemistry I  
CHEM 1140 General Chemistry II

### Additional Electives for Students Interested in Engineering

PHYS 1610 Engineering Mechanics: Statics  
PHYS 1620 Engineering Mechanics: Dynamics

## Bachelor of Arts (BA) Degree

This major is intended for students who wish to double major in other disciplines. It is also a major that can be done in three years for those who decide late. It is a total of 46 credits (13 courses)

#### 1. Physics courses (18 credits)

PHYS 1230 General Physics I  
PHYS 1240 General Physics II  
PHYS 3540 Modern Physics  
PHYS 3600 Mathematical and Computational Methods  
For Physicists and Engineers  
PHYS 5900 Junior Seminar (2 semesters)  
PHYS 5910 Senior Seminar (2 semesters)  
PHYS 5920 Research Project-Based Advanced  
Laboratory (2 semesters)

#### 2. Courses outside physics (16 credits)

MATH 1170 Calculus I  
MATH 1180 Calculus II  
MATH 3320 Multivariable and Vector Calculus  
MATH 3720 Differential Equations

#### 3. Electives (choose 3: one must be 5000-level or higher) (12 credits)

PHYS 3520 Physical Optics  
PHYS 3700 Condensed Matter Physics  
PHYS 3750 Thermodynamics and Statistical Mechanics  
PHYS 3800 Electronics and Instrumentation  
PHYS 5930 Theoretical Mechanics  
PHYS 5940 Advanced Electromagnetic Field Theory  
PHYS 5950 Advanced Quantum Mechanics  
PHYS 5955 Advanced Topics in Physics

## Minor

#### 1. Physics courses

PHYS 1230 General Physics I  
PHYS 1240 General Physics II  
PHYS 3540 Modern Physics  
PHYS 5900 Junior seminar  
or PHYS 5910 Senior seminar (2 semesters total)

#### 2. Electives (choose 2: at least one must be 1600-level or higher, the other may be one of the following specialty courses intended for non-science majors) (8 credits)

PHYS 1110 Energy, Environment and the Economy  
PHYS 1140 Physics of Sound and Music

*Note:* Completing BOTH semesters of Physical Chemistry (CHEM 3550 & 3560) can count toward either the BA or the minor in place of PHYS 3540 & 3750

## Suggested First-Year Schedule

### Fall

FYSEM

MATH 1170

ENGL 1110

CHEM 1130

or elective

### Spring

PHYS 1230

MATH 1180

elective

CHEM 1140

or elective

## Why a Physics Degree is a Great Start to a Career in Engineering

There are a few serious benefits to doing a physics degree first, then choosing the field of engineering in graduate school:

- Physics provides students with a general problem solving background that prepares students well for any field of engineering...it is actually quite common for a student to begin college thinking they want to do one type of engineering, but switch to another...this is usually quite difficult because the fields are so specialized, but students going from physics to engineering are almost always successful (our recent graduates haven't had more difficulty than a short transition period, then they were typically ahead of the rest).
- Having only an undergraduate degree in engineering can get someone a job, but having a master's degree in engineering can often allow you to go much further with a company than you could with the bachelor's alone. Having a physics background, too, especially at a liberal arts school like Hamline, helps tremendously with advancement...in addition to the problem solving skills, we focus so much on students working in groups, giving presentations, etc., that we always get good feedback about our students' interview skills and ability to work with others.
- If there is any chance that a student might switch engineering fields, just having that four years of time while doing the physics degree gives time to better explore those engineering fields.

Most of our graduates go to graduate school in some type of engineering, so we definitely see evidence for all of this. We would be happy to answer questions from prospective students, show them around the department, or put them in contact with recent graduates that have gone on to careers in physics or engineering.