GRAND VALLEY STATE UNIVERSITY
SABBATICAL LEAVE REQUEST APPLICATION FORM

1. **Name:** Jonathan Hodge
2. **Date employed by GVSU:** August 2002
3. **College:** College of Liberal Arts and Sciences
4. **Unit:** Mathematics
5. **Semester(s) and year of latest sabbatical leave:** None
6. **Dates of Leave of Absence as faculty since the latest sabbatical leave:** None
7. **Sabbatical leave is being requested for this year and semester(s)**

   Fall _____ **Winter** _____ **Academic Year:** 2008-2009
8. **Sabbatical Title:** The Integers and Beyond: Explorations in Abstract Algebra
9. **Are grants, fellowships, or other financial support expected during the sabbatical leave? Specify.**

   I have been offered a half-time visiting position in the mathematics department at Hope College. The financial support from this position will be equivalent to half of my base salary, and I will be required to teach two courses (one prep) during the fall semester and one course during the winter semester.
10. **Is acceptance of a sabbatical award dependent on your receiving some additional support? Specify.**

    No. However, if my offer from Hope College should for some reason change, then I will request that my academic year leave be converted to fall semester leave, and I will adjust the timeline accordingly.
11. **Where will the sabbatical work be done?** At Hope College and from my home. I will occasionally have meetings related to the project at Grand Valley.
12. **In accord with the Sabbatical Policy as stated in Chapter 4, 2.30.4D of the Administrative Manual (see also Chapter 3, Section 3.04.C.5.d, Chapter 3, Section 3.04.E.6,7 and Chapter 4, Section 4.02 item 2.30.4.D, Faculty Handbook), I agree to submit a written account of my activities and a financial statement by the end of the term following my leave. I will remain at Grand Valley State University for at least one year after completion of my leave regardless of the length of the sabbatical.**

_____

Signature of Applicant Date

This sabbatical request has been reviewed by:

_____(approval, disapproval, or approval as modified)
Unit Date

_____(approval, disapproval, or approval as modified)
Applicant's Unit Head Date

_____(approval, disapproval, or approval as modified)
Chairperson, College Personnel Committee Date

_____(approval, disapproval, or approval as modified)
Dean Date

_____(approval, disapproval, or approval as modified)
Provost Date

SABBATICAL APPLICATION FORM FOR PREPARATION OF SABBATICAL LEAVE REQUESTS

A. This application is to be submitted to the College Dean no later than November 1 of the academic year preceding the academic year of leave. Unit review must therefore be complete before November 1.

B. Please type using 12 point font (either single or double space) a maximum of 10 pages for the narrative. Supporting letters and documents may be placed in an appendix. Use the "Sabbatical Leave Request Application Form" as the cover page to your proposal. Your Dean's office will tell you how many copies are needed.

C. Using this form, fill in the expandable gray boxes (Numbers 1-8) with narrative text. Please follow the instructions given under each heading, and be sure to complete each field.

1. Descriptive title of your project.

The Integers and Beyond: Explorations in Abstract Algebra

2. Goals and objectives.

Proposals must have a clear conceptual focus. Be certain that the conditions and criteria for sabbatical leave as stated in the Administrative Manual, chapter 4, section 2.30.4.D), have been addressed. Proposals should be specific about the academic purpose of the leave. In particular, a proposal should conform to some or all of the following:

a) a planned effort to retrain professionally (with approval of the chair);
b) development of new capabilities for teaching or research;
c) a synthesis or development of prior effort or experiences;
d) concern with a significant problem, area, or issue in the field of study;
e) promise of a significant contribution to the subject under study or problem undertaken;
f) practice of skills or application of research result which deepens or extends the applicant's professional capabilities.

The primary objective of this project is to compile, develop, and disseminate a collection of activities and materials suitable for use in Grand Valley's Math 310 (Modern Algebra) course.

Math 310 is required of all mathematics majors at GVSU, and the topics covered by this course are an essential part of the undergraduate mathematics curriculum. In spite of this fact, appropriate instructional materials for Math 310 and its follow-up course, Math 410 (Modern Algebra 2), have proved to be difficult to find. Over the past five years, most sections of Math 310 have used photocopies of an out-of-print textbook, not because it is an ideal book, but because it seems to be a better fit than any of the other texts in a relatively small pool of potential alternatives. Even so, many instructors have found this "best" option to be inadequate, and some have chosen to forgo a textbook altogether and instead use their own activities and notes.

The difficulty in finding a suitable textbook for Math 310 can be attributed primarily to Grand Valley's unique approach to the teaching of abstract algebra, which is marked by three distinguishing characteristics:

- **A "rings-first" approach.** The primary objects of study in abstract algebra are mathematical structures known as groups, rings, and fields. In most introductory abstract algebra sequences, students first learn about groups and then move on to study rings and fields. A less common approach is to begin with fields and then move on to rings and groups. Grand Valley's approach is different from both of these; we begin with rings in Math 310, focus on groups in Math 410, and study fields in both courses. We believe that this approach is preferable, since the study of rings more naturally draws on students' well-developed intuition and experience with familiar number systems such as the integers, the real numbers, sets of polynomials, and sets of matrices, all of which are examples of rings. These examples are also particularly relevant to future K-12 teachers, who make up a significant majority of the students who take Math 310.

- **An emphasis on intuition and examples.** Even though Grand Valley's abstract algebra sequence begins with rings, several instructors of Math 310 do not formally define a ring until several weeks into the semester. Instead, a significant amount of time is spent investigating examples of both new and familiar rings, with the goal of discovering the axioms that ultimately define what a ring is. By discovering the definition of a ring within the context of these examples, students develop a better understanding of the importance of rings, and also see for themselves how the definition of a ring generalizes the algebraic properties of a variety of familiar number systems.

- **An emphasis on active learning.** Many mathematics textbooks are designed to be read, but not necessarily engaged, by the reader. In contrast, the materials that result from this project will require students to be actively involved in the development of course content. Each activity will be designed to carefully lead students to discover important results or concepts. The text will be punctuated by questions that must be answered in order for readers to move on to subsequent material. Readers will be forced to actively engage the subject matter instead of being passive observers of a finished product. This approach is consistent with the teaching philosophy and methods used by many current GVSU mathematics department faculty.

Although some abstract algebra textbooks adopt a rings-first approach, few are consistent with GVSU's use of motivating examples, and none encourage active learning to any significant extent. (See Appendix A for descriptions of several current rings-first textbooks.) Thus, it seems timely and worthwhile to compile a cohesive and complete set of materials that could be used in place of a textbook in Math 310. **This effort constitutes a development of new capabilities for teaching or research, since the resulting materials will enable faculty to more effectively teach a course that is required for all mathematics majors. It addresses a significant problem in the teaching and learning of abstract algebra, and it makes a significant contribution toward this problem by developing effective materials for rings-first abstract algebra courses.**

As noted earlier, several members of GVSU's mathematics faculty have developed their own activities and materials for use in Math 310. As such, **much of this project will involve a synthesis or development of prior effort or experiences.** In particular, I plan to work extensively with Profs. Steve Schlicker and Ted Sundstrom, each of whom have taught Math 310 and Math 410 numerous times and have developed a variety of activities for these courses. I will take the lead in combining our prior efforts and drafting activities that reflect all three of our prior experiences teaching abstract algebra. I anticipate that I will spend a significant amount of time merging activities that have common themes and writing new activities that draw on ideas from multiple sources. Even those activities that do not require substantive changes will need to be edited and re-formatted so that the resulting materials speak consistently and in one voice. This is a serious and time-consuming effort that is vital to creating a useful and coherent finished product. Furthermore, additional material such as exercises and projects, discussions and solutions to accompany each activity, and other instructor resources will need to be developed.

In addition to the work described above, I also plan to spend a significant amount of time investigating potential venues for publication and dissemination of the materials that result from this project. While Profs. Schlicker, Sundstrom, and I are not opposed to publishing our work in traditional textbook format, we would also like to explore other options such as web-based licensing and distribution. I will be responsible for investigating these various options and reporting back to Profs. Schlicker and Sundstrom.

It is important to note that this project is not intended to create materials that will become the de facto required textbook for every section of Math 310 taught at GVSU. However, I would like the materials developed to be useful to as many of my colleagues as possible, both at GVSU and at other institutions. For this reason, I will solicit preliminary input and suggestions from current GVSU faculty who have recently taught Math 310 or Math 410 (including Manish Chakrabarti, Karen Novotny, and Clark Wells). I will also seek feedback from external reviewers throughout the development process. I have already contacted several colleagues from other institutions (Lisa Townsley from Illinois Benedictine University, Rick Klima from Appalachian State University, Joe Fox from Salem State College, and Reva Kasman from Salem State College), all of whom have agreed to be considered as potential reviewers for the project.

Finally, it should also be noted that while the primary emphasis of this project is on materials for Math 310, my efforts will also establish a basis for future work involving the development and dissemination of activities for Math 410 as well. Thus, this project is the first step in developing a complete set of materials that could be used to teach all of the topics typically covered in a two-course, undergraduate-level abstract algebra sequence.

3. Evidence of preparation.

   Describe academic preparation that contributes to feasibility of the project, placing the planned activity in the context of your field. There shall be a thorough attempt by the proposer to search the literature and to place the planned activity in the context of that literature. This may take the form of literature citations, consultations, and indication of previous work in the field. If a book is being written, append an outline or table of contents to demonstrate that groundwork has been laid.

Since first coming to Grand Valley, I have been actively involved in both curriculum development and the teaching of abstract algebra. I have been granted two separate Pew

Scholar Teacher Awards. The first (for Summer 2004), was supplemental to a grant from the Educational Advancement Foundation, which led to a published textbook on the mathematics of voting and elections, now used in GVSU's Math 330 (The Mathematics of Voting and Elections) course. The second (for Summer 2006 and AY 2006-2007) resulted in a manuscript that is now being used for the third consecutive semester in GVSU's Math 408 (Advanced Calculus 1) course, and for which a publisher is currently being sought.

During the Fall 2007 semester, I am teaching Math 310 for the fifth time, and I am scheduled to teach it again during the Winter 2008 semester. Over the past few years, I have developed approximately 25 activities that I currently use in Math 310. I have met with Profs. Schlicker and Sundstrom to discuss both the nature of our intended collaboration and the topics to be covered by the proposed materials. (See the attached proposed table of contents.) I have also provided a brief literature review that describes currently available rings-first textbooks. Finally, as mentioned earlier, I have contacted several potential reviewers from other institutions.

4. Project Plan.
Describe the sabbatical project. Show how that plan relates to its goals and objectives.

During the 2007-2008 academic year, I will solicit suggestions and input from current and past GVSU mathematics faculty who have recently taught Math 310. I will share this information with Profs. Schlicker and Sundstrom, and we will meet periodically to finalize both the topics and the format of the proposed materials. During the Winter 2008 semester, Prof. Sundstrom and I will both teach Math 310, collaborating and using each others' materials as much as possible.

During my sabbatical leave (2008-2009 academic year), my time will be spent on the tasks described in Section 2 above. In particular, I plan to:

- Meet regularly with Profs. Schlicker and Sundstrom.
- Synthesize previously developed activities, merging activities with common themes and writing new activities when necessary.
- Write and/or compile exercises and projects to accompany each activity.
- Develop solutions, discussions, and other instructor resources.
- Solicit feedback from external reviewers, and make appropriate revisions to materials based on this feedback.
- Investigate and pursue potential venues for publication, including both traditional and web-based options.
- Working with Profs. Schlicker and Sundstrom, finalize a list of Math 410 topics for future materials. Finalize a plan and timeline for developing these additional materials.

Following my sabbatical leave, I will arrange for classroom testing of the materials developed, and I will continue to be involved in the development of follow-up materials for Math 410. I will also work with Profs. Schlicker and Sundstrom to ensure timely dissemination of our work.

5. Timetable.

Indicate estimated dates for each of the significant steps in the project plan. Be as specific as possible. Include an explanation showing whether the project can be completed in the time available. If the sabbatical leave is being used to begin a longer term project, state when you expect the whole activity to be completed.*

Date(s)	**Task(s)**
January – April, 2008	Solicit input and suggestions from GVSU mathematics department faculty.
May – August, 2008	Outline major topics for each activity. Decide on major formatting and stylistic features.
September 2008	Begin compiling and organizing previously used activities and materials. Research publication venues, and revise intended style and/or format if necessary.
October 2008 – March 2009	Write and revise activities, completing approximately one major topic per month. (See attached table of contents.) Continue researching and pursuing various publication options. Prepare descriptive materials (for instance, a prospectus and sample activities) for potential publishers.
April 2009	Make final revisions to Math 310 materials. Finalize plan and timeline for completing Math 410 materials.
August 2009	If necessary, meet with publishers at Mathfest (summer meetings of the Mathematical Association of America, to be held in Portland, OR).
August 2009 – April 2010	Classroom test manuscript at GVSU and continue development of Math 410 activities.
End of 2009	Finalize publication / dissemination plans.
End of 2010	Complete all classroom testing and assemble completed materials for publication / dissemination.

6. Benefit to one's own or other units.
A clear relationship between the proposed sabbatical leave and a proposer's academic unit shall be demonstrated. If your project is to benefit a unit other than your home unit, describe that situation. Attach signed, written verification of that benefit from the head of that other unit.

This project has the clear benefit of creating instructional resources for Math 310, a course that is required for all mathematics majors. While it is not my intent to develop materials that other colleagues would be required to use, I do suspect that many colleagues would at least consider these materials as an option for their courses. Certainly my collaborators, Profs. Steve Schlicker and Ted Sundstrom, plan to use these materials in their own future sections of Math 310. Furthermore, since I plan to continue teaching Math 310 in the years to come, this project will improve my effectiveness in this capacity and thus positively impact my future students. Finally, continued work on this project after the official conclusion of my sabbatical leave will be of use to future students and instructors of Math 410 as well.

7. Arrangements with people or other institutions.
If the project requires collaboration with other institutions or persons, describe the collaboration and provide evidence that the institutions or persons involved agree with the arrangements.** If not, please indicate that no collaboration is necessary or planned. For books, indicate interest of potential publisher if available. You may append correspondence.

I have attached a copy of the contract for the visiting position I have been offerred at Hope College.

8. Other relevant information.

9. Appendices.

a. Attach copies of previous sabbatical reports in the Appendix.

I have had no previous sabbatical leaves.

b. Attach a copy of your curriculum vitae in the appendix.
This should be current and complete. Include a list of publications, exhibitions, performances, and productions.

A copy of my vita is attached.

c. Attach letters of support or other supporting documentation.

I have attached letters of support from Profs. Steve Schlicker and Ted Sundstrom.

D. If modification is made after a step in the review process but prior to the College Personnel Committee recommendation, incorporate the modification into the appropriate section of the final proposal as opposed to appending pages. If changes are proposed after the final approval

but before or during the sabbatical period, prior consultation with the chair of the unit should occur and a new formal plan document must be approved by the Dean and the Provost before implementation of the proposed plan.

E. Final Report. Each faculty member returning from sabbatical leave will provide a written account of the sabbatical activities and accomplishments and deposit copies with his/her appointing officer and unit head, the Provost, the President, the Research and Development Center, and the library. The report shall be filed no later than the end of the first semester after return to campus and shall include an account of the financial remuneration received during the sabbatical leave. Failure to complete the approved sabbatical project, submit a final report or participate in dissemination of sabbatical work may negatively affect an annual salary adjustment and decisions on future sabbatical proposals.

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*In such a case, your sabbatical report is to be made as scheduled by the policy stated in the Administrative Manual even if the entire project is unfinished. Report on whatever was accomplished during the sabbatical leave.

**If there is a possibility of creating Intellectual Property during a sabbatical and you are involved in external collaboration with another university, business or organization, it is important to review the GVSU and collaborating institution Intellectual Property Policy (IPP) prior to initiating work activities. For support in the IPP review contact GVSU legal counsel.

Revised 6/06

The Integers and Beyond: Explorations in Abstract Algebra

Proposed Table of Contents

6. Divisibility and Factorization in Integral Domains
    a. Euclidean domains
    b. Primes and irreducibles
    c. Unique factorization domains
    d. Principal ideal domains

Appendix A: Review of Selected Rings-First Algebra Texts

1. Spence and Vanden Eynden, *Elementary Abstract Algebra.* Harper Collins, 1993.

This is the out-of-print textbook that most sections of Math 310 have used in recent years. Although its development of rings through examples is generally consistent with the approach taken by Math 310 instructors, the presentation is quite traditional and not easily amenable to an active learning approach to instruction. The fact that the book is out-of-print also makes it an inconvenient choice.

2. McCoy and Janusz, *Introduction to Abstract Algebra*, 6th edition. Academic Press, 2001.

This book was adopted for several sections of Math 310 during the 2006-2007 academic year. Some instructors who used it found its approach to be inconsistent with the typical Math 310 development of the definition of a ring via numerous motivating examples. In particular, the text discusses the integers only briefly before presenting the formal definition of a ring, and other examples of rings are discussed only after the formal definition has been presented. The text's treatment of the integers is also inconsistent, both in content and organization, with the typical Math 310 approach.

3. Childs, *A Concrete Introduction to Higher Algebra*, 2nd edition. Springer Verlag, 2000.

This book was considered as a potential option for the 2006-2007 academic year, but did not receive a significant amount of support from Math 310 instructors. While the presentation is motivated by examples, the text's treatment of rings omits or treats only briefly several topics that are central to Math 310. The text's organization is inconsistent with the typical presentation of topics in Math 310, and the ring theory topics that are covered are scattered among other topics that are not typically covered in Math 310.

4. Stillwell, *Elements of Algebra: Geometry, Numbers, Equations*. Springer, 2001.

This book was also considered for the 2006-2007 academic year, but its selection of topics is not at all suitable for Math 310. Although this text presents rings and fields before groups, the overall emphasis is on topics not typically covered in Math 310. Of all of the books considered as options for Math 310, this one seems to be the least appropriate choice.

5. Hungerford, *Abstract Algebra: An Introduction*, 2nd edition. Brooks Cole, 1996.

This text is generally consistent with the selection and organization of topics typically covered in Math 310. It provides some motivating examples of rings before introducing the formal definition, although current Math 310 instructors typically consider even more examples than those presented in the text. Furthermore, like Spence and Vanden Eynden, the approach taken is very traditional and does not foster active student involvement in the learning process.

GRAND VALLEY STATE UNIVERSITY

One Campus Drive
Allendale, MI 49401

Department of Mathematics
2307 Mackinac Hall

Dr. Ted Sundstrom, Professor
Telephone: (616) 331-2041
Fax: (616) 331-3120
e-mail: sundstrt@gvsu.edu

Oct. 22, 2007

Re: Letter of Support for Sabbatical Leave Request for Jonathan Hodge

I have been teaching mathematics at Grand Valley for 34 years, and perhaps too late in my career, I have learned something new, which is: When you cannot find a textbook that does not contain the appropriate material for a course and more importantly, does not supports your method of teaching, write your own textbook. I did this on my sabbatical during the winter 2000 semester when I wrote a textbook for MTH 210 – Communicating in Mathematics.

One of the motivating factors for my sabbatical was that there were no textbooks available that supported the way I wanted to teach MTH 210 and covered the appropriate material prescribed by the department. Many of us who teach MTH 310 are faced with a similar situation and would very much like to have a "home grown textbook." The difficulties we are facing are described very well in Dr. Hodge's Sabbatical Leave Application, and I believe that Dr. Hodge is very well qualified to complete the project he has described. He already has experience in coauthoring a textbook for MTH 330 (The Mathematics of Voting and Elections) and has worked with Dr. Clark Wells in developing materials for MTH 408 (Advanced Calculus) that have an "active-learning approach." I am well aware of the approach Dr. Hodge uses when teaching MTH 310 since I have substituted for him on a few occasions and used some of the materials he has written. I was quite impressed with the quality of these materials.

I look forward to working closely with Dr. Hodge and Dr. Steve Schlicker in the development of materials for MTH 310. All three of us have written materials for much of the course and it will be exciting and interesting to combine them into one set of instructional materials for MTH 310. I will be teaching MTH 310 this coming semester and will be using the materials that Dr. Hodge, Dr. Schlicker, and I have written along with supplemental material from other sources. All three of us have similar, but not identical, teaching philosophies for this course. It may be a challenge to develop one set of materials that all of us can use when teaching the course, but it will be a worthwhile challenge because it has the potential of creating something truly unique for this type of course that will contain the appropriate mathematical content with an emphasis on intuition and examples and active learning. It will be wonderful teaching MTH 310 with this type of textbook or course materials.

Sincerely,

Ted Sundstrom

Dr. Ted Sundstrom, Professor of Mathematics

GRAND VALLEY
STATE UNIVERSITY

College of Liberal Arts and Sciences
Mathematics Department

To: Mathematics Department
From: Steven Schlicker
Professor
Department of Mathematics
Re: Sabbatical Proposal of
Jon Hodge

October 22, 2007

Jon Hodge is applying for a sabbatical for the academic year 2008-09 to work on a complete set of teaching materials for our year-long sequence in Modern Algebra. This is a collaborative project that involves Ted Sundstrom and me, with Jon taking the lead. There is a great deal of work to be done – Jon, Ted, and I have each written a significant amount of material that we have used in MTH 310 (Modern Algebra I), and all of this material has to be reviewed, compiled, edited, rewritten in some instances, and formatted as a cohesive whole. The ultimate package we envision will not be a traditional text, but teaching materials that will actively involve students in their learning. For this reason, we will investigate options for disseminating our final product both within and beyond the traditional publishing process. The method of dissemination for this project is critical, in my opinion, and it will take significant time and effort to find the right outlet. I'm glad Jon has agreed to investigate several possibilities for publication as part of his sabbatical. I fully support Jon's plan to take the initiative to begin the work on this project and believe there is much more work to be done than can be completed in a one year sabbatical.

I will participate in this project by contributing materials I have developed for MTH 310, 410 (Modern Algebra II), 610 (Modern Algebra), 625 (Number Theory) for consideration; piloting materials developed in 2008-09; continuing to create activities and supporting materials for MTH 410 (I'm scheduled to teach MTH 410 in W08 and W09); reviewing, and commenting on materials developed; and brainstorming with both Ted and Jon on format, content, and all other pertinent aspects of the project.

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HOPE COLLEGE

OFFICE OF THE PROVOST

October 16, 2007

Jonathan K. Hodge
Department of Mathematics
Grand Valley State University
Allendale, MI 49401

Dear Jonathan:

I am pleased to extend an offer to you to join the Hope College faculty as Visiting Associate Professor of Mathematics, on a 0.50 FTE appointment effective July 1, 2008. This letter sets forth all of the terms of the employment offer extended by Hope College.

We have established your salary at $28,750 for the 2008-2009 academic year. Payment will be made semimonthly over a twelve-month period unless you request in writing a ten-month period. This position does not include benefits.

The precise nature of your teaching responsibilities is to be determined by the chairperson of the Department of Mathematics, Professor Darin Stephenson, in consultation with Dean Moses Lee. All other terms and conditions of your employment not specified in this letter are spelled out in the *Faculty Handbook*, which is available online at http://www.hope.edu/admin/provost.

Your appointment continues through May 15, 2009. At the present time, we do not expect the appointment to continue beyond that date. Professor Stephenson or Dean Lee will keep you apprised of any change in circumstances.

If you accept our offer, please sign the enclosed copy and return it to my office within two weeks. Please also complete and return the enclosed I-9 employment eligibility verification form which will enable us to establish your personnel record and Hope College email account. **Please include a copy of your driver's license and social security card or passport and date the form July 1, 2008.**

If there is anything we can do to assist you in your decision, please feel free to contact Dean Lee, Professor Stephenson or me.

Sincerely,

James N. Boelkins
Provost

Hi Jon,
I'm very pleased that you will be at Hope. I look forward to visiting w/ you.
J.

JNB:lz\visiting faculty contract
enclosure
pc: Professor Darin R. Stephenson, Chairperson
Dean Moses Lee
Payroll/Human Resources (date signed copy received _____)

I accept an appointment to the Hope College faculty on the terms and conditions set forth in this letter. No other representations, oral or written, have been made to me.

_____ _____
Date Signature

DE WITT CENTER / 141 EAST 12TH STREET / PO BOX 9000
HOLLAND, MICHIGAN 49422-9000 / 616-395-7785 / FAX 616-395-7111

VITA

Jonathan K. Hodge
Department of Mathematics
Grand Valley State University
Allendale, MI 49401
e-mail: hodgejo@gvsu.edu

EDUCATION

Ph.D.	2002	Western Michigan University Area: Mathematics (Voting Theory) Dissertation Title: *Separable Preference Orders* Advisor: Allen J. Schwenk
M.A.	2000	Western Michigan University Area: Mathematics
B.S.	1998	Calvin College Area: Mathematics (honors)

PROFESSIONAL EXPERIENCE

2002 – Present	Assistant Professor of Mathematics Grand Valley State University, Allendale, MI
1999 – 2002	Graduate Teaching Assistant Western Michigan University, Kalamazoo, MI
2000 – 2001	Mathematics Instructor Academically Talented Youth Program (ATYP) Western Michigan University, Kalamazoo, MI
1999	Mathematics Teacher Sylvan Learning Center, Grand Rapids, MI
1998	Adjunct Mathematics Instructor Northwestern Michigan College, Traverse City, MI

HONORS/AWARDS

2003 – 2004	R. L. Moore Project NExT Fellow Mathematical Association of America

2002	All-University Graduate Research and Creative Scholars Award The Graduate College, Western Michigan University
2002	Yousef Alavi Outstanding Doctoral Student Award Department of Mathematics, Western Michigan University
2001	Charles H. Butler Teaching Excellence Award Department of Mathematics, Western Michigan University
1999 – 2002	GAANN Fellowship Department of Mathematics, Western Michigan University

PUBLICATIONS

J.K. Hodge and M. TerHaar. Classifying interdependence in multidimensional binary preferences. To appear, *Mathematical Social Sciences*.

J.K. Hodge and P. Schwallier. How does separability affect the desirability of referendum election outcomes? *Theory and Decision* 61(3): 251-276, November 2006.

J.K. Hodge. Permutations of separable preference orders. *Discrete Applied Mathematics* 154(10):1478-1499, June 2006.

J.K. Hodge. The top ten things I have learned about discovery-based teaching. *PRIMUS* 26(2):154-161, June 2006.

J.K. Hodge and R.E. Klima. *The Mathematics of Voting and Elections: A Hands-On Approach.* Volume 22 of *Mathematical World.* American Mathematical Society, Providence, May 2005.

W.J. Bradley, J.K. Hodge, and D.M. Kilgour. Separable discrete preferences. *Mathematical Social Sciences* 49(3):335-353, 2005.

J.K. Hodge. *Separable Preference Orders*. Ph.D. thesis. Western Michigan University, Kalamazoo, MI, August 2002.

WORKS IN PROGRESS

J.K. Hodge and C. Wells. *An Analysis Sketchbook*. Activities-based textbook developed as part of a Pew Scholar Teacher Award. Currently being considered for publication.

J.K. Hodge. The mathematics of referendum elections and separable preferences. Submitted to *Mathematics Magazine*.

J.K. Hodge. *Instructor's Manual for The Mathematics of Voting and Elections: A Hands-On Approach.* Currently in development for online distribution.

PRESENTATIONS

Invited Talks:

The Mathematics of Referendum Elections and Separable Preferences, presented at:

- Hope College Mathematics Colloquium, Holland, MI, October 2007
- Grand Valley State University Mathematics REU, Allendale, MI, June 2006.
- MAA Michigan Sectional Meeting, Grand Rapids, MI, May 2006.
- Miami University Mathematics Colloquium, Oxford, OH, March 2006.

Classifying Interdependence in Referendum Election Preferences, presented at the Calvin College Mathematics Colloquium, Grand Rapids, MI, December 2005.

A Moore-Style Course on the Mathematics of Voting and Elections, presented at the 8th Annual Legacy of R.L. Moore Conference, Austin, TX, April 2005.

The Top Ten Things I Have Learned About Discovery-Based Teaching, presented at the 7th Annual Legacy of R.L. Moore Conference, Austin, TX, March 2004.

Separable Discrete Preferences, presented at the Joint Mathematics Meetings, Phoenix, AZ, January 2004.

Teaching Students How to Write Proofs, panelist for Project NExT session at Mathfest, Burlington, VT, July 2002.

Reflections on My Research Experiences, presented for the Grand Valley State University mathematics REU, Allendale, MI, July 2002.

A Quick Introduction to Separable Preference Orders, presented at the Graduate Research and Teaching Awards, Western Michigan University, Kalamazoo, MI, April 2002.

Separability and Symmetry and Algebra, Oh My!, presented at:

- Calvin College, Grand Rapids, MI, October 2002.
- Hope College, Holland, MI, April 2002.
- Pi Mu Epsilon, Western Michigan University, Kalamazoo, MI, February 2002.

Trouble in Democracy: The Separability Problem in Referendum Elections, presented at:

- Kalamazoo College, Kalamazoo, MI, October 2000.
- Pi Mu Epsilon, Western Michigan University, Kalamazoo, MI, February 2000.

Contributed Talks:

A Moore-Inspired Advanced Calculus Course at Grand Valley State University, presented at the 10th Annual Legacy of R.L. Moore Conference, Austin, TX, April 2007.

Great Ideas for Teaching Students (GIFTS), presenter/panelist for session at Math in Action, Grand Rapids, MI, February 2007.

The Mathematics of Voting and Elections, workshop at National Council of Teachers of Mathematics regional conference, Chicago, IL, September 2006.

The Mathematics of Voting and Elections, workshop at Math in Action, Grand Rapids, MI, February 2006.

How Does Separability Affect the Desirability of Referendum Election Outcomes? (with Pete Schwallier), presented at the Mathematics Department Seminar, Grand Valley State University, Allendale, MI, November 2005.

The Mathematics of Voting and Elections, workshop at Michigan Council of Teachers of Mathematics annual meeting, Grand Rapids, MI, October 2005.

A Course on the Mathematics of Voting and Elections, presented at Mathfest, Albuquerque, NM, August 2005.

The Mathematics of Voting and Elections: A Discovery-Based Approach, minicourse at National Council of Teachers of Mathematics regional conference, Minneapolis, MI, November 2004.

The Mathematics of Voting and Elections, workshop at Michigan Council of Teachers of Mathematics annual meeting, Detroit, MI, October 2004.

Designing and Teaching Courses for Non-mathematics Majors, panelist and co-organizer for Project NExT session at Mathfest, Providence, RI, August 2004.

Separable Preferences and Admissible Characters (with Micah TerHaar), presented at:

- Grand Valley State University, Allendale, MI, September 2003.
- Western Michigan University, Kalamazoo, MI, October 2003.

R. L. Moore and the Teaching of Mathematics, presented at the Science and Mathematics Division Research Colloquium, Grand Valley State University, Allendale, MI, March 2003.

Permutations of Separable Preference Orders, presented at Public Choice Society, Nashville, TN, March 2003.

A Quick Introduction to Separable Preference Orders, presented at the Science and Mathematics Division Research Colloquium, Grand Valley State University, Allendale, MI, October 2002.

Separable Preference Orders, presented at Western Michigan University, Kalamazoo, MI, July 2002.

Separable Preferences and The Symmetric Group, presented at the Joint Mathematics Meetings, San Diego, CA, January 2002.

Some Questions Regarding Separable Preference Orders, presented at Western Michigan University, Kalamazoo, MI, September 2001.

Separable Relations on Cartesian Product Sets, presented at Horizons in Combinatorics, Nashville, TN, May 2001.

On Ky Fan's Minimax Theorem, presented for the Analysis Seminar, Western Michigan University, Kalamazoo, MI, November 2000.

Identifying Dependencies in Binary Preferences, presented at Public Choice Society, New Orleans, LA, March 1998.

Identifying Dependencies in Binary Preferences, presented at the Calvin College Mathematics Colloquium, Grand Rapids, MI, March 1998.

Media Appearances:

Guest (with Rick Klima) on *The Edge with Tom Smith*, a talk radio program on 1520AM in Tampa, FL. Participated in two one-hour interviews on the mathematics of voting and elections, July 2005 and September 2005.

Sponsored Undergraduate Research Presentations/Poster Sessions:

Mark Krines and Jennifer Lahr (NSF-funded REU, 2007), *Finding and Maintaining Separable Preferences*, presented at:

- Mathfest, San Jose, CA, August 2007.
- Michigan REU Mini-Conference, Grand Valley State University, July 2007.

Pete Schwallier (GVSU Student Summer Scholars, 2005), *How Does Separability Affect the Desirability of Referendum Election Outcomes?*, presented at:

- Mathematics Department Seminar, Grand Valley State University, Allendale, MI, November 2005.
- Mathfest, Albuquerque, NM, August 2005.
- Michigan REU Mini-Conference, Grand Valley State University, Allendale, MI, July 2005.

Micah TerHaar (GVSU Student Summer Scholars, 2003), *Separable Preferences and Admissible Characters*, presented at:

- Posters on the Hill, Council on Undergraduate Research, Washington, DC, April 2004.
- Pi Mu Epsilon, Western Michigan University, Kalamazoo, MI, October 2003.
- Michigan Undergraduate Mathematics Conference, Grand Rapids, MI, October 2003.
- Mathematics Department Seminar, Grand Valley State University, Allendale, MI, September 2003.
- Mathfest, Boulder, CO, August 2003.
- Student Summer Scholars poster session, Grand Valley State University, Allendale, MI, August 2003.
- Michigan REU Mini-Conference, Central Michigan University, Mt. Pleasant, MI, July 2003.

GRANTS RECEIVED

Pew Scholar Teacher Award ($3,000), Grand Valley State University, for developing a discovery-based curriculum for advanced calculus, May 2006 – April 2007.

Student Summer Scholars Grant ($6,000), Grand Valley State University, for undergraduate research during Summer 2005.

Pew Scholar Teacher Award ($5,100), Grand Valley State University, for development of discovery-based materials on the mathematics of voting and elections, May – August 2004.

Educational Advancement Foundation Grant ($7,750), for development of discovery-based materials on the mathematics of voting and elections, May – November 2004.

Student Summer Scholars Grant ($6,000), Grand Valley State University, for undergraduate research during Summer 2003.

OTHER PROFESSIONAL ACTIVITIES

- Textbook reviewer for Prentice Hall, 2007.
- Referee for *Mathematical Inequalities and Applications*, 2007.
- Referee for *The College Mathematics Journal*, 2005 – 2007.
- Referee for *Mathematics Magazine*, 2005.
- Textbook reviewer for Brooks-Cole publishers, 2004.
- Referee for *Theory and Decision*, 2002.

PROFESSIONAL AFFILLIATIONS/MEMBERSHIPS

- American Mathematical Society
- Mathematical Association of America
- Phi Beta Kappa
- Michigan Council of Teachers of Mathematics
- Pi Mu Epsilon

COURSES TAUGHT

Grand Valley State University:

- Math 122: College Algebra
- Math 201: Calculus I
- Math 202: Calculus II
- Math 210: Communicating in Mathematics
- Math 304: Analysis of Differential Equations
- Math 310: Modern Algebra
- Math 325: Discrete Structures for Computer Science II
- Math 330: The Mathematics of Voting and Elections
- Math 345: Discrete Mathematics
- Math 408: Advanced Calculus I

Western Michigan University:

- Math 114: Excursions in Mathematics (freshman-level survey course, recitation sections)
- Math 118: Precalculus
- Math 122: Calculus I
- Math 123: Calculus II
- Math 314: Mathematical Proofs
- ATYP (Academically Talented Youth Program) Accelerated Algebra I/II

Northwestern Michigan College:

- Math 131: Introduction to Probability and Statistics

SERVICE ACTIVITIES

Grand Valley State University:

2007	Chair, Mathematics Textbook Selection Policy Task Force
2007 – Present	Member, Mathematics Advisory Committee
2006 – Present	Co-chair, Math in Action (conference for K-12 mathematics teachers)
2005 – 2006	Member, Mathematics Search Committee
2004 – 2005	Member, Science/Math Cluster Curriculum Committee
2004 – 2005	Chair, Mathematics Curriculum Committee
2003 – 2006	Member, Mathematics Curriculum Committee
2003 – 2004	Member, Mathematics Search Committee

Western Michigan University:

2001 – 2002	Graduate Representative, Pi Mu Epsilon
2001 – 2002	Graduate Representative, Mathematics Undergraduate Committee

REFERENCES

Available upon request.