



MAT 127

Calculus C - Fall 2005

HOME	SCHEDULE & INSTRUCTORS	SYLLABUS	HOMEWORK	GRADING
LINKS				

MAT 127 is the final course of the three-semester calculus sequence **MAT 125**, **126** and **127**. We will cover this semester essential and beautiful tools such as differential equations, sequences and series, power series and their applications.

Course Coordinator

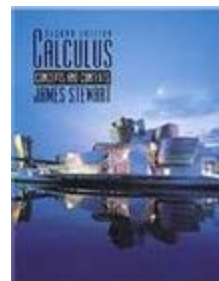
Sorin Popescu (office: Math 3-109, tel. 632-8255, e-mail [sorin at math.sunysb.edu](mailto:sorin@math.sunysb.edu))

Office hours: Tu 11:15am-12:45pm, Thu 11:15am-12:15pm

Textbook:

Calculus - Concepts and Contexts (Single Variable), 2nd Edition, by James Stewart.

Available from the university bookstore or check prices at [AddAll](#).



Check the syllabus to determine which sections will be covered each week, and come to class having read those sections. Reading the textbook will greatly increase your comprehension of the lectures and enable you to ask useful questions in class. Furthermore, the lecturers will not always be able to cover all of the subject material for which you will be responsible.

Prerequisites:

The course is heavily dependent on the material you studied in **MAT 125** and **MAT 126**. You are therefore specifically encouraged to review the following material from your textbook:

Chapter	1	2	3	4	5	Appendices
Sections	5,6	2-8	1,2,4-7	2,3,5,9	3-7,10	A,B,C,F

Exam Schedule & Policies

Midterm I, Thursday 10/6, 8:30-10:00 pm

You must bring your photo ID to the exam. The first midterm covers sections 7.1 through 7.5. Room assignments for the first midterm are based upon your lecture and are as follows:

Lecture	Exam room
---------	-----------

Lect 2 & 3	Lib Alliance W0512
Lect 1	Hvy Eng 201
Lect 4	Psy A137

A [practice midterm exam](#) is now available via the usual iLrn web interface. It has unlimited takes and is for no credit. Once you press the **End Assignment** button you will also be able to view/print solutions for the practice midterm.

Midterm **Review session** 09/30 in Math Tower P-131, 2:30-pm-4:00pm

Midterm II, Tuesday 11/8, 8:30-10:00 pm

You must bring your photo ID to the exam. The second midterm covers sections 7.6 through 8.4 (but not the Ratio test). Room assignments for the second midterm are based upon your lecture and are as follows:

Lecture	Exam room
Lect 1 & 2	Old Eng 143
Lect 3 & 4	Old Eng 145

A [practice midterm exam](#) will be available via the usual iLrn web interface. It has unlimited takes and is for no credit. Once you press the **End Assignment** button you will also be able to view/print solutions for the practice midterm.

No calculators, notes, or books are allowed during the exams. Exam problems will require pencil-and-paper reasoning only. You are expected to show your work and provide reasonable justification for all answers. Please note that makeup exams are only given for unforeseeable circumstances beyond the student's control. In particular, schedule conflicts are not an acceptable reason: please let your lecturer know about any schedule conflicts as soon as possible. You must have ID to be admitted to the exams.

Final Exam Information

Final exam, Wed, Dec 21 11am-1:30pm

You must bring your photo ID to the exam. The final exam covers all the material studied this semester. Room assignments for the final exam are based on your lecture and are as follows:

Lecture	Exam room
Lect 1 & 2	Old Eng 143
Lect 3 & 4	Old Eng 145

A [practice final exam](#) is now available via the usual iLrn web interface. It

covers only sections 8.5-8.10, has unlimited takes and it is for no credit. (The actual final exam is however comprehensive.) Once you press the **End Assignment** button you will also be able to view/print solutions for the practice final exam.

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Grading

20% Homework and web-based homework
20% Midterm 1
20% Midterm 2
40% Final Exam

Grades for Lectures 1, 2, and 4 are now posted on the Solar system, grades for Lecture 3 will be posted later today.

Technology

Your textbook includes a CD-ROM which, like an electronic tutor, will try to offer helpful hints to guide you through those homework problems for which the problem number appears in a red box. This CD will only run on Windows machines; and in any case, its use is strictly optional. Students may also *occasionally* find it helpful to use a graphing calculator when reading the text or doing homework. The TI83 is a standard, recommended choice. Please note, however, that the use of calculators will **not** be permitted during the exams!

Math Learning Center

The **Math Learning Center** (MLC), located in Room S-240A of the Math Tower, is an important resource. It is staffed most days and some evenings by mathematics tutors (professors and advanced students). For more information and a schedule, consult the [MLC web site](#).

Special needs

If you have a physical, psychiatric, medical or learning disability that may impact on your ability to carry out assigned course work, you may contact the Disabled Student Services (DSS) office (Humanities 133, 632-6748/TDD). DSS will review your concerns and determine, with you, what accommodations may be necessary and appropriate. I will take their findings into account in deciding what alterations in course work you require. All information on and documentation of a disability condition should be supplied to me in writing at the earliest possible time AND is

strictly confidential. Please act early, since I will not be able to make any retroactive course changes.

Sorin Popescu
2005-08-15



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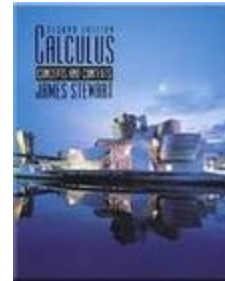
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Sorin Popescu
2005-08-15



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Lecture 1

[Kingshook Biswas](#) (office: Math 3-119, tel. 632-????, e-mail [kbiswas at math.sunysb.edu](mailto:kbiswas@math.sunysb.edu))

Office hours: M 11:00am-12:00pm, Tu 10:00am-11:00am

Class Meetings: MWF 9:35am-10:30am, Harriman Hall 112

Lecture 2

[Sorin Popescu](#) (office: Math 3-109, tel. 632-8255, e-mail [sorin at math.sunysb.edu](mailto:sorin@math.sunysb.edu))

Office hours: Tu 11:15am-12:45pm, Thu 11:15am-12:15pm

Class Meetings: TuTh 12:50pm-2:10pm, Harriman Hall 116

Lecture 3

[Martin Reiris](#) (office: Math 2-112, e-mail [martinr at math.sunysb.edu](mailto:martinr@math.sunysb.edu))

Office hours: Tu 5:45pm-6:45pm MLC, Th 4:45pm-6:45pm Math 2-112

Class Meetings: TuTh 6:50pm-8:10pm, Physics P112

Lecture 4

[Ibrahim Unal](#) (office: Math 3-118, tel. 632-????, e-mail [iunal at math.sunysb.edu](mailto:iunal@math.sunysb.edu))

Office hours: Mo 11:00am-12:00pm MLC, Wed 11:00am-12:00pm Math 3-118

Class Meetings: MWF 9:35am-10:30am, Earth & Space 69

Graders

[Michael Chance](#) (office: Math 4-122, e-mail [mchance at math.sunysb.edu](mailto:mchance@math.sunysb.edu))

[Jianhua Xu](#) (office: MLC, e-mail [jxu at grad.physics.sunysb.edu](mailto:jxu@grad.physics.sunysb.edu))

Office hours: MLC, Tu 11:00am-12:00pm

[James Crispino](#) (office: Math S-240, e-mail [crispino at math.sunysb.edu](mailto:crispino@math.sunysb.edu))

Office hours: MLC, Mo 10:30am-11:30am

2005-08-15



MAT 127

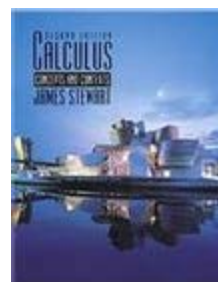
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The course is heavily dependent on the material you studied in MAT 125 and MAT 126. You are therefore specifically encouraged to review the following material from your textbook:

Chapter	1	2	3	4	5	Appendices
Sections	5,6	2-8	1,2,4-7	2,3,5,9	3-7,10	A,B,C,F

Course description & Homework assignments:

New material will be presented every week during the lectures. You should read the corresponding section of the text before coming to class, according to the following week-by-week list of reading and homework assignments:

Week	Topic	Notes	Homework assignments
8/29-9/4	Modeling with differential equations		7.1: 2,5,6,14 web homework
9/5-9/11	Direction fields/Euler's method	No classes 9/5 (Labour day)	7.2: 9,11,18,22 web homework
9/12-9/18	Separable equations		7.3: 6,24,34,35 web homework
9/19-9/25	Exponential growth and decay		7.4: 1,2,9,10,14,18 web homework
9/26-10/2	The logistic equation		7.5: 3,6,7,9 web homework

10/3-10/9	Predator-prey systems	No classes 10/3-10/5 (Rosh Hashanah) Midterm I, Th 10/6, 8:30-10:00 pm	7.6: 1,3,4 web homework
10/10-10/16	Sequences	No classes 10/12 after 5pm, No classes 10/13 (Yom Kippur)	8.1: 5,6,9,14,24,40 web homework
10/17-10/23	Sequences cont, Series		8.2: 4,9,11,13,19,20,43 web homework
10/24-10/30	Convergence tests		8.3: 1,2,11,15,18 web homework
10/31-11/6	More convergence tests; Power series		8.4: 3,8,13,23,24,29 web homework
11/7-11/13	Power series; Representing functions as power series	Midterm II, Tue 11/8, 8:30-10:00 pm	8.5: 3,5,8, 8.6: 7,9,14 web homework
11/14-11/20	Taylor and Maclaurin series		8.7: 10,11,17,20 web homework
11/21-11/27	Taylor and Maclaurin series cont, Binomial series	No classes 11/24-11/26 (Thanksgiving)	8.7: 35,39,40 web homework
11/28-12/4	Power series and ODEs		8.8: 4, 8.10: 1,2,5 web homework
12/5-12/11	Power series and ODE cont, Review		
12/12-12/18	Review	Classes end 12/13	
12/21		Final Exam Wed, 11:00am-1:30 pm	

Grading

20% Homework and web-based homework
20% Midterm 1
20% Midterm 2
40% Final Exam

Links

The following is a (growing) list of web sites and java applets devoted to topics relevant for your class:

- A java [applet](#) for experimenting with the Malthus/Verhulst models of population growth.
- A [Slope Field Calculator](#) java applet.
- A [ODE Solution Verifier](#) (java applet).
- A simple [java demonstration](#) of Euler's method.
- A java [applet](#) implementing Euler's method (it displays also the slope field)
- Java [tutorial](#) on Exponential Growth and Decay
- A [Predator Prey \(Lotka-Volterra\) Model Java Simulation](#)
- Another [Lotka-Volterra Predator-Prey](#) mini tutorial (java).
- Two [Power series](#) java applets. They plot the graph of a function resulting from adding up the first 11 terms of a power series (coefficients can be adjusted by means of scroll bars or just typed in - second applet only).

Sorin Popescu
2005-10-15



MAT 127

Calculus C - Fall 2005

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Homework

This semester, we are trying out a new system of doing homework in **MAT127** by mixing weekly assigned "classical" problem sets with web-based homework (to be completed online).

You are encouraged to discuss homework problem together. However, each student must write up the homework or complete the corresponding web-based homework individually!

Homework will be assigned weekly; check [here](#) for the specific weekly assignments. Note that the odd-numbered (paper) problems have answers in the back of the textbook. You should nonetheless try and solve these problems without recourse to the answer key, and should write the problem up carefully in your own words even if you have consulted the book for the final answer: always show your work.

You will also complete part of the homework problems via a [web interface](#) provided by the publisher of the textbook. One of the benefits of the web-based system is that it will provide immediate feedback about whether your answers are right and wrong.

Web-based homework problems are much like the usual ones: you need to give answers to a series of short questions, some of them multiple-choice, others not. The only difference is that instead of doing it on paper, you are doing it over the Internet. You can access the [web interface](#) from any computer which has an Internet connection, whether from home, from one of the University SINC sites, or say from an Internet cafe in Paris. No special software is required: all you need is a relatively recent Web browser. Also, you can do the web-based homework whenever you want (of course, before the deadline). You can look at the problems, or even print some of them, then go home, think them over, and come back later with your answer. In fact, this is perhaps the recommended way of doing the web-based homework.

Please note that each problem has many variants, and different students are given different variants. So do not try to compare your answers to that of your classmates.

The web-based assignments are set up so you can do "unlimited logins", which means you can work on the assignment for a while, then leave and come back later. For this you will **NEED** to click on the **Save Progress** button; do **NOT** click on the **End Assignment** button before you are

finished with the homework and are ready to submit it for grading. There is **NO** way to edit your answers after clicking on **End Assignment**.

Warning: If you do not click **Save Progress** before logging out or closing your browser window, the program may end the assignment for you due to (long) inactivity (say more than 10-15 minutes). Thus it is very important to click **Save Progress** if you wish to come back to the assignment at a later time.

If you submit an answer and get it wrong, you get another try, although you lose part of a point for each wrong answer you give. You have **3 tries**; after the third incorrect answer, the problem will be permanently marked "incorrect".

For any questions regarding web-based assignments please contact [Michael Chance](#) (office: Math 4-122, e-mail [mchance at math.sunysb.edu](mailto:mchance@math.sunysb.edu)). Please include your **Name and SB id** and put **MAT127** in your subject line, or you will **NOT** get an answer to your email!

Registration and logging in

Before you can use the web-based homework web site, you will need to register for the system and choose your user name and password (this is separate from registering for the course!). To do so, please follow the instructions below.

If you don't have a computer, you can use the ones in the University [SINC sites](#), or most public computers such as those in libraries. This system doesn't work well with customized versions of Internet Explorer, such as the browser for AOL. Many people have had good success using the free [Mozilla browser](#). We use the Mozilla Firefox browser to set up the assignments, and haven't had any problems.

The first thing you have to do is to get set up with the system if you haven't done so already. Here's how:

1. [Go to the iLRN site](#) and click on **First Time Users**.
2. Put "Stony Brook" in the search box, click **Search**, then select *SUNY - STONY BROOK* from the list on the right.
3. On the next page, enter the key

E-2SG5NR3P9Y9T7

where it wants the Course Access Code, and enter your email address.

4. On the next page, specify a password.
5. On the last page, fill out the rest of the information. **It is important you give your name and student ID number**

correctly so that you can get credit for your work. Please enter your last/first name and Stony Brook ID exactly as they appear in your registrar record.

6. Finally, when you log in, the system will check that you have an appropriate Java plug-in installed, and have popup windows enabled.

For problems/questions regarding setting up an account for the web-base homework please contact [Michael Chance](mailto:mchance@math.sunysb.edu) (office: Math 4-122, e-mail [mchance at math.sunysb.edu](mailto:mchance@math.sunysb.edu)). Please include your **Name and SB id** and put **MAT127** in your subject line, or you will **NOT** get an answer to your email!

Printing homework assignments

It may seem that you have to do your homework at the computer. This is not the case (although you certainly can if you wish). You can log in, print out your homework assignment, do the work, and enter the answers later. Here's how to do this (it isn't obvious):

- From the page where you select the assignment you want to do, click the **Take** button if you haven't started the assignment yet. When the page comes up, click **Start**.
- When the first problem comes up, if you don't have time to do it now, click **Print** in your browser menu. Do this for each problem you would like to print out. You may then click **Save Progress** and come back later to enter your answers for the assigned homework.

Homework Policies

Web based homeworks are due at noon on Thursdays in the week following the week in which they appear; for example, the web based homework, assigned in week 1, is due Thursday Sept 8. It is better to work on the problems well before the due date, both because you'll learn better and because you'll save yourself headaches when the inevitable computer glitch happens.

All other (paper) homework assignments are due in the first class-meeting following the week in which they appear: for example the problems for the week 8/29-9/4 are due Tue, Sep. 6 for sections 2 and 3 and Wed, Sep. 7 for sections 1 and 4.

Late homeworks will not be accepted.

Basic guidelines for submitting homework:

- Every student must have the following heading on his assignment:

- Surname, Name
- University ID Number
- Date Submitted
- MAT 127/ Prof *****
- Assignment (e.g., 7.2: 24, 32, 36)
- One problem per page. You may use both the front and the back sides of a page.
- All of the homework pages MUST be stapled together.
- Do not use GRAPH paper for homework.
- Use black or dark blue ink when writing up answers for your homework assignments. Do NOT use RED ink and do NOT use PENCIL.
- A complete solution will include the following:
 - The statement of the problem
 - An organised presentation of ideas leading to a solution
 - An answer that is circled or boxed
 - If a problem has multiple parts it should be solved as though each part were a separate problem, following the order in which parts are listed.
- NO WORK = NO CREDIT. This is especially valid for problems whose answer is given at the end of the book!
- Any breach of academic integrity will be pursued accordingly.



Sorin Popescu

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Phone: (631)-632-8255
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Research Interests: Algebraic Geometry, Commutative Algebra, Combinatorics and Computational methods

Teaching:

Spring 2006









[MAT 311 Number Theory](#)

[MAT 614 Topics in Algebraic Geometry](#)












Previous years

[Teaching Archive](#)

Algebra, Geometry and Physics seminar: [Spring 2006](#)



Publications & E-Prints: Unless otherwise indicated, the files below are DVI files () , PostScript files () , PDF files () , or tar gzipped DVI and PostScript files () . Files marked as () or () are hyperlinked PDF or Macromedia Flash files formatted for screen viewing. Other formats (source, PS using Type I fonts) can be obtained via the UC Davis Front to the [Mathematics ArXiv](#). Click on () or () for related [Macaulay2](#), or [Macaulay](#) code.

Syzygies:










- [Gale Duality and Free Resolutions of Ideals of Points](#) [] , [] [] [] [] , *Invent math* **136** (1999) 2, 419-449
David Eisenbud and Sorin Popescu
- [The Projective Geometry of the Gale Transform](#) [] , [] [] [] , *J. Algebra* **230** (2000), no. 1, 127-173
David Eisenbud and Sorin Popescu
(in the D. Buchsbaum anniversary volume of *J. Algebra*)
- [Syzygy Ideals for Determinantal Ideals and the Syzygetic Castelnuovo Lemma](#) [] [] , [[MathSci](#)] ,

Springer 1999

David Eisenbud and Sorin Popescu

- [Extremal Betti Numbers and Applications to Monomial Ideals](#) [] [] [] [], *J. Algebra* **221** (1999), no. 2, 497-512
Dave Bayer, Hara Charalambous and Sorin Popescu
- [Lagrangian Subbundles and Codimension 3 Subcanonical Subschemes](#) [], [] [] [], *Duke Math. J.* **107** (2001), no. 3, 427-467
David Eisenbud, Sorin Popescu and Charles Walter
- [Enriques Surfaces and other Nonpfaffian Codimension 3 Subcanonical Subschemes](#) [] [] [] [], *Comm. Algebra* **28** (2000), 5629-5653
David Eisenbud, Sorin Popescu and Charles Walter
(in the Hartshorne anniversary volume of *Comm. Algebra*)
- [Syzygies of Unimodular Lawrence Ideals](#) [] [] [] [], *J. Reine Angew. Math* **534** (2001), 169-186
Dave Bayer, Sorin Popescu and Bernd Sturmfels
- [Hyperplane Arrangement Cohomology and Monomials in the Exterior Algebra](#) [] [] [] [] [], *Trans. AMS.* **355** (2003), 4365-4383
David Eisenbud, Sorin Popescu and Sergey Yuzvinsky
- [Exterior algebra methods for the Minimal Resolution Conjecture](#) [] [] [] [], *Duke Math. J.* **112** (2002), no. 2, 379-395
David Eisenbud, Frank-Olaf Schreyer, Sorin Popescu and Charles Walter
- [Symmetric resolutions of coherent sheaves](#) [] [] []
David Eisenbud, Sorin Popescu and Charles Walter
- [A note on the Intersection of Veronese Surfaces](#) [] [] [] [] [],
David Eisenbud, Klaus Hulek and Sorin Popescu
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- [The Geometry of Bielliptic Surfaces in \$P^4\$](#) [], [] [], *Internat. J. Math.* **4** (1993), no. 6, 873-902
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- [On Surfaces in \$P^4\$ and Threefolds in \$P^5\$](#) [] [] [], [**MathSci**], LMSLN **208**, 69--100
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- [Surfaces of degree \$\geq 11\$ in the Projective Fourspace](#) [] [] [] + [Appendix](#) [] [] []
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PRAGMATIC 1997: A summer school in Catania, Sicily

- [Research Problems for the summer school](#) [], [] [], [**MathSci**], *Matematiche* (Catania) **53** (1998), 1-14
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Algorithmic Algebra and Geometry: Summer Graduate Program (1998) at MSRI:

- Poster [] [], [lecture slides and streaming video](#) , CD ROM,
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




Linear algebra notes

- [On circulant matrices](#) [], [] [] [] [],
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Upcoming conferences:

- DARPA FunBio Mathematics-Biology Kick-off meeting, Princeton, September 21-23, 2005
- [MAGIC 05: Midwest Algebra, Geometry and their Interactions Conference](#), University of Notre Dame, Notre Dame, October 7-11, 2005
- [AMS Special Session on Resolutions](#), Eugene, OR, November 12-13, 2005
- [Clay Workshop on Algebraic Statistics and Computational Biology](#), Clay Mathematics Institute, November 12-14, 2005
- [CIMPA School on Commutative Algebra](#), December 26, 2005 - January 6, 2006, Hanoi, Vietnam
- [AMS Special Session on Syzygies in Commutative Algebra and Geometry](#), San Antonio, TX, January 12-15, 2006
- [KAIST Workshop on Projective Algebraic Geometry](#), January 23-25, 2006, Korean Advanced Institute of Science and Technology, Daejeon
- [AMS Special Session on the Geometry of Groebner bases](#), San Francisco, CA, April 29-30, 2006
- [Castnuovo-Mumford regularity and related topics](#), Workshop at CIRM, Luminy, France, May 9-13, 2006
- [Commutative Algebra and its Interaction with Algebraic Geometry](#), Workshop at CIRM, Luminy, France, May 22-26, 2006
- [Syzygies and Hilbert Functions](#), Banff International Research Meeting, Canada, October 14-19, 2006

Past conferences:

- A [conference](#) on algebraic geometry to celebrate Robin Hartshorne's 60th birthday, Berkeley, August 28-30, 1998
- [Western Algebraic Geometry Seminar](#), MSRI, Berkeley, December 5-6, 1998
- [Conference on Groebner Bases, Guanajato](#), Mexico, February 8-12, 1999
- [The Pacific Northwest Geometry Seminar](#) 
- [Computational Commutative Algebra and Combinatorics](#), Osaka, July 21-30, 1999. 
- [Kommutative Algebra und Algebraische Geometrie](#), Oberwolfach, August 8-14, 1999. 
- [AMS Western Section Meeting](#) Salt Lake City, UT, September 25-26, 1999.
- [Algebra and Geometry of Points in Projective Space](#), Napoli, February 9-12, 2000.
- [AMS Spring Eastern Sectional Meeting](#) Lowell, MA, April 1-2, 2000.
- [Algèbre commutative et ses interactions avec la géométrie algébrique](#), Centre International de Rencontres Mathématiques, June 5-9, 2000.
- [Topics in Classical Algebraic Geometry](#), Oberwolfach, June 18-24, 2000 
- [AMS Fall Central Section Meeting](#) Toronto, Ontario Canada, September 22-24, 2000
- [AMS Fall Eastern Section Meeting](#), New York, Columbia U. in New York, November 4-5, 2000
- [Exterior algebra methods and other new directions in Algebraic Geometry, Commutative Algebra and Combinatorics](#), 8-15 September 2001, Ettore Majorana Centre, Erice, Sicily, Italy. [Photos](#) from the conference.
- [Classical Algebraic Geometry](#), Oberwolfach, May 26 - June 1, 2002 
- [Current trends in Commutative Algebra](#), Levico, Trento, June 17-21, 2002
- [Birational and Projective Geometry of Algebraic Varieties](#), Ferrara, September 2-8, 2002
- [Commutative Algebra, Singularities and Computer Algebra](#), Sinaia, September 17-22, 2002. [Photos](#) from the conference.
- [James H. Simons Conference on Quantum and Reversible Computation](#), Stony Brook, May 25-31, 2003

- [Conference on Commutative Algebra](#), Lisbon, June 23-27 2003. [Photos](#) from the conference. Also [photos](#) from Belém.
- [Commutative Algebra and Interactions with Algebraic Geometry and Combinatorics](#), ICTP, Trieste, June 6-11
- [III Iberoamerican Congress on Geometry](#), Salamanca, June 7-12
- [Projective Varieties: A Conference in honour of the 150th anniversary of the birth of G. Veronese](#), Siena, June 8-12 , 2004. [Photos](#) from the conference.
- [Algebraic Geometry: conference in honour of Joseph Le Potier & Christian Peskine](#), Paris, June 15-18, 2004
- [Classical Algebraic Geometry](#), Oberwolfach, June 27-July 3, 2004
- [Combinatorial Commutative Algebra](#), Oberwolfach, July 4-10th, 2004

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