CURRICULUM VITAE

of Dimitrina Ninova Stavrova

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Sofia 1421, Bulgaria

Highest Degree:

1981: Ph.D. from "St. Kliment Ohridski" University of Sofia.
Title of the thesis: "Cardinal Invariants for Neighbourhood Spaces".
Thesis referees: Prof. Dr. Peter Kenderov and Prof. Dr. Nikolay Hadjiivanov.
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Recognitions:

Fulbright Senior Research Grant - awarded in 1994/1995 academic year. Spent in Auburn University, Auburn, AL.

Membership in Professional Societies:

-Member of the American Mathematical Society since 1995.
-Member of the Union of Bulgarian Scientists since 1986.
-Member of the Union of Bulgarian Mathematicians since 1976

Positions held:

2004 - present – Principal Assistant Professor, Sofia University "St. Kliment Ohridski", Department of Mathematics and Informatics, Division of Complex Analysis and Topology and Division of Computer Informatics, Sofia, Bulgaria.

1999-2004: Visiting Assistant Professor, Miami University, Department of Mathematics and Statistics, Oxford, Ohio, USA.

1988-1999: Principal Assistant Professor, Department of Mathematics and Informatics, Division of Complex Analysis and Topology, Sofia University "St. Kliment Ohridski", Sofia, Bulgaria.

1985-1988: Assistant Professor - medium rank, Sofia University "St. Kliment Ohridski", Department of Mathematics and Informatics, Division of Topology, Sofia, Bulgaria .

1984-1985: Assistant Professor - junior rank, Sofia University "St. Kliment Ohridski" Deaprtment of Mathematics and Mechanics, Division of Topology, Sofia, Bulgaria.

1982-1984: Researcher, Institute of Mathematics, Bulgarian Academy of Sciences, Section on Topology, Sofia, Bulgaria.

Professional duties:

1.Teaching:

Courses taught:

At the Department of Mathematics and Informatics, the Department of Chemistry and the Physics Department of **Sofia University "St. Kliment Ohridski"** (http://portal.uni-sofia.bg/index.php/eng/), Bulgaria (for students in Mathematics, Applied Mathematics, Informatics, Computer Sciences, Physics and Informatics, Informatics and Chemistry):

- Analysis/Calculus I and II –
- Computational Topology (application of Algebraic Topology in Computer Science - developed and taught since 2005/2006)
- Foundations of Theoretical Computational Topology (since 2008/2009)
- Applications of Topology in Computer Graphing (for Master degree)
- Introduction to the Topology of Metrisable Spaces (since 2004/2005).
- Introduction to Set Theory and Topology
- Cardinal invariants for topological spaces (for Master's and PhD degree)

At the Department of Mathematics and Statistics, **Miami University, Oxford, Ohio, USA** (1999-2004):
- Calculus 151 /Analysis (1999-2004)
- Introduction to Topology (graduate course for Master degree,2003/2004).

Other teaching related responsibilities:

- Developing learning materials, preparing schemes of work and maintaining records to monitor student progress, achievement and attendance. Computer-based lecture presentations.
- Participating in the development, administration and marking of exams and other assessments.
- Giving regular tutorials as allocated by the department.
- Providing pastoral care and support to my students, guiding them in their course choice and supporting them with their master applications in the universities worldwide.
- Helping the administration of our department in developing new programmes of study (two new bachelor's courses) and other activities as requested.

2. Supervising:

Presently I supervise two Master students in Computer Graphics. During 2006-2008 I supervised a master student in Computer-based teaching of Analysis.

Since 2005/2006 I have been supervising course projects for students in Computational Topology (approximately 12 teams of 7-8 students each, yearly). In December 2009 twelve of my students got European Union Awards for their student projects.

For the academic years 1992/1993 and 1993/1994 I supervised a graduate study in Topology for the Master Degree. My student - Ivajlo Kortezov wrote three publications based on the results obtained in his diploma thesis work. They were published in Comptes Rendue of the Bulgarian Academy of Sciences and Questions and Answers in General Topology, Japan.

3. Research:

My research is in the field of General, Set-theoretic and Computational Topology. Specifically – symmetrizable and o-metrizable spaces; cardinal invariants for topological and more general spaces; separation axioms in Topology; notion of compactness; topological simplifications of algorithms for image reconstruction; general homology theory and applications to image processing; box homology.

Research Papers:

Presently I am the author (or co-author) of about 30 scientific research papers published in refereed journals most of them with impact factor (list of publications provided separately).

Funded Research Projects:

- **2010-2011** - research grant **"Theoretical and applied approaches in computer modelling"** funded by the Research Fund of Sofia University .
- **2009-2010** - research grant **"Theoretical and applied approaches in software development"** funded by the Research Fund of Sofia University .
- **2006-2007, 2007-2008, 2008-2009** - research grant **"Means and Principles of Computer Modeling"** sponsored by the Research Fund of Sofia University .
- Summer of **2002** - **research grant** from Miami University, Oxford, Ohio for conducting joint research with Prof. Sheldon Davis, Miami University.
- 1994-1997 - research project in the field of General Topological and Related Structures - supported by **Grant#MM427/1994-1997** from the National Scientific Foundation at the Bulgarian Ministry of Science and Education.
- Research project in the field of General and Set-Theoretical Topology - supported by **Grant#MM28/1991-1994** from the National Scientific Foundation at the Bulgarian Ministry of Science and Education.
- Research project in the field of Set-Theoretic Topology supported **by Grant #19/1993-94** from the Scientific Research Foundation of "St. Kliment Ohridski" University of Sofia.
- Research project in the field of General Topology, - supported by **Grant #36/1988-1990** from the Bulgarian Ministry of Science and Education.
- Research project in the field of General Topology - supported by **Grant #45/1985-1988** from the Bulgarian Ministry of Science and Education.
- Joint Austro-Bulgarian research project in the field of General Topology and the Applications of the Theory of Symmetrisable Spaces into Physics and space-time continuum models between the Institute of Mathematics of the Bulgarian Academy of Sciences and Graz University sponsored by the Austro-Bulgarian Program for Scientific and Cultural Development.

Additional Duties:

Referee's duties:

I was a referee of two Master Thesis works in the field of Topology.

Reviewer of Mathematical Review and Zentralblat in the field of General Topology.

Referee of Mathematical Balkanika, Questions and Answers in General Topology, Tamkang Journal of Mathematics, Fundamenta Matematicae, Topology and its Applications, Topology Proceedings.

Organisational and administrative:

Scientific Secretary of the Division of Topology , "St. Kliment Ohridski" University of Sofia, Department of Mathematics and Mechanics, Sofia, Bulgaria:1985-1989.

Scientific Secretary of the Division of Complex Analysis and Topology: 1992-1994. "St. Kliment Ohridski" University of Sofia, Department of Mathematics and Informatics, Sofia, Bulgaria.

Main organiser of the Topology Conference, Primorsko, Bulgaria, 1984

Organiser of the Topology Conference, Varna, Bulgaria, 1991

Member of the Program Committee of the 30-th Spring Conference of the Union of Bulgarian Mathematicians – 1998.

Member of the Executive Board of The Bulgarian Fulbright Alumnae Association, 1998-1999.

Member of Bulgarian Fulbright Alumnae Association since 1995

Work in the Team for training young talented high school students for national and international Mathematical Olympiads and Competitions.

Nationwide I have been visiting several training camps for preparing students for National and International Mathematics Competitions and Olympiads. I have been lecturing on advanced high school material – Fibonacci Numbers, Recurrent Sequences and their limits, Application of Calculus, Proving Equalities and Inequalities. I have taken part in preparing problems for National Competitions and Olympiads and also contributing to the International ones.

Computer skills:

Windows, DOS, HTML, Chi Writer, Word for Windows, TeX, PPT, WinEdit, MathType

Hypertext Editor of "Topology Atlas" - an Internet WWW site for topology - http://www.at.yourku.ca/ , 1995-1998.

Invited professional talks:

-2009, December: Oxford University, Oxford UK – Talk at the seminar of Analytic Topology group.

-2008, December: Oxford University, Oxford UK – Talk at the seminar of Analytic Topology group.

-2000, Spring: Miami University, Topology Research Seminar - 8 talks

-1999, November: Miami University, Department of Mathematics and Statistics, Oxford, Ohio (Colloquial Talk)

-1996, May: Talk at the Second Fulbright Conference in Europe, Sofia.

-1995, October: Talk at "St. Kliment Ohridski" University of Sofia during the Scientific Session devoted to the University patron - St. Kliment Ohridski.

-1995, June: Talk at the Institute of Mathematics of Oxford University, Oxford, UK (during my one-week visit at Merton College)

-1995, May: Auburn University, Department of Mathematics (Colloquial talk presenting main results obtained during my Fulbright Research work there)

-1994/1995: Two talks at the Topology Seminar at Auburn University (chaired by Prof. Gary Gruenhage)

-1995, February: University of Kansas, Department of Mathematics, Lawrence, Kansas, USA (Colloquial departmental talk and a talk at the Topology Seminar).

-1995, January: Sofia University, Department of Mathematics (Talk at the Logic Seminar).

-1994, December: Talk at the Joint Logic Seminar of Sofia University and Institute of Mathematics of the Bulgarian Academy of Sciences.

Talks at the International Professional Conferences:

-Contributed talk at the Spring Scientific Session, Sofia University, **2009.**

-Contributed talk at the Section of Topology at Phoenix AMS Meeting, January **2004.**

-Contributed talk at the Section of Topology at San Diego AMS Meeting, January **2002**.
-Contributed talk at TOPO2000 - 2000 Summer Conference on Topology and its Applications, Oxford, Ohio, **USA, July 2000.**
-Contributed talk at the Spring Conference in Topology and Dynamical Systems, San Antonio, Texas, **USA, March, 2000.**
-Contributed talk at the 8-Th Prague International Topological Symposium, Prague, **Czech Republic**, **August, 1996.**
-Contributed talk at the Sofia-Nish Topology Seminar, Gjulechica, **Bulgaria June, 1995**.
-Contributed talk at the Spring Conference in Topology and Dynamical Systems, Newark, Delaware, **USA, April, 1995.**
-Contributed talk at the International Colloquium in Topology, Szeksart, **Hungary, September, 1994**
-Contributed talk at Sofia-Nish Topology Seminar, Sofia**, Bulgaria, October, 1991.**
-Contributed talk at the International School in Topology, Varna, Sofia, **Bulgaria**, **September, 1990.**
-Contributed talk at the International Conference in Topology, Baku, **USSR, October, 1987.**

Long Term Professional Visits:

-1999-2004, Miami University, Department of Mathematics and Statistics, **Oxford, OH,** Visiting Assistant Professor.
-1994/1995(September-June), Auburn University, Department of Mathematics , Auburn University, Auburn, Alabama, **USA**; **Fulbright Senior Research Grant** #18723; Faculty Associate - Prof. Gary Gruenhage; Title of the Research project - "Cardinal Functions for Topological and General Spaces - ZFC and Model Approach".
-1994, Guest-Professor, TEMPUS project; Athens University, Department of Mathematics, Athens, Greece, June, 1995.
-1990, Visit at **Moscow State University, Moscow, Russia,** Department of Mathematics, November/December.
-1986/1987, Visit at the **Institute of Mathematics of the Hungarian Academy of Sciences, Budapest, Hungary** (November 1988 - February 1987).
-1979, Visit at **Moscow State University**, Department of Mathematics, Moscow, USSR (March-June 1979): specialisation during the Ph.D. study supervised by Prof. A.Arhangelski.

Short Term Professional Visits:

-Oxford University (St Edmund Hall), **UK, December, 2009.**
-Oxford University (St Edmund Hall), **UK, December, 2008.**
-**Oxford University** (Merton College), **UK**, **June, 1995.**
-**The University of Kansas**, Lawrence, Kansas, **USA**. **February, 1995.**
-**Charles University**, Prague, **Czechoslovakia**, **August, 1986.**
-**Technical University of** Graz, **Austria**, **October, 1984.**
-**Banach Semester on Topology**, Warsaw, **Poland, June, 1984.**

Proficiency in foreign languages:

English - fluent;
Russian - fluent;
French - good;
Greek - good;
German – reasonable

List of professional referees:

☐**Prof. Sheldon Davis, (Ex-Coordinator for a Teaching Team for Second Year Faculty,** Department of Mathematics and Statistics, Miami University, Oxford, Ohio 45056) Presently: Mathematics Department Chair, University of Texas at Tyler, 3900 University Blvd, Tyler , TX 75799, **tel: 001 903.565.5839; e-mail : Sheldon_Davis@uttyler.edu ,** (work related)

☐**Prof. Vesko Valov,** Department of Computer Science and Mathematics, Nipissing University, 100 College Drive, Box 5002, North Bay, ON P1B 8L7, Canada; **e-mail : veskov@nipissingu.ca , tel: (705) 474-3461 ,**(work related)

☐**Prof. Frederick Gass, Director of Undergraduate Mathematics and Calculus Coordinator,** (teaching reference) Department of Mathematics and Statistics, Miami University, Oxford, Ohio 45056, **e-mail: gassfs@muohio.edu; phone (513) 529-5822.** (work related)

☐**Assoc. Prof. Magdalina Todorova** (teaching reference), Ex-Dean for undergraduate teaching, Department of Mathematics and Informatics, Sofia University "St.Kliment Ohridski", 5 James Boucher blvd ,Sofia 1126, Bulgaria; **tel: (00359) 8161558; e-mail: todorova_m@hotmail.com, magda@fmi.uni-sofia.bg** .

☐ **Prof. Anatoly Gryzlov,** Department of Mathematics, Udmurt State University, Ijevsk 426037, Russia; **e-mail – gryzlov@uni.udm.ru ;**
tel: 003412501078 (work related)

☐**Dr Audrey Curnock, Director of Undergraduate studies**; Mathematical Institute, Oxford University, 24-29 St Giles', Oxford, OX1 3LB **tel: 01865 (6) 15202; e-mail - curnock@maths.ox.ac.uk, audrey.curnock@keble.ox.ac.uk** (work related)

☐**Prof. Stylianos Negrepontis,** Department of Mathematics, Athens University, Panepistemiopolis, Athens 157 84, Greece; **tel: (0030) 210 727 6315; fax - (0030) 210 727-6410; e-mail - snegrep@math.uoa.gr** (work related)

☐**Assoc. Prof. Evgenia Velikova** (teaching reference), Dean for undergraduate teaching, Department of Mathematics and Informatics, Sofia University "St.Kliment Ohridski", 5 James Boucher blvd ,Sofia 1126, Bulgaria**; tel: (00359) 2 622273 ; e-mail: velikova@fmi.uni-sofia.bg** .

List of publications of Dimitrina N. Stavrova

In refereed journals:

1. On the notion of compactness in computational topology, Mathematics and mathematical education, Proceedings of 39th Spring Conference of UBM, Sofia , Bulgarian Academy of Sciences, April 2010, http://www.math.bas.bg/smb/2010_PK/tom/index.html , www.math.bas.bg/**smb**/2010_PK/tom/pdf/292-299.pdf

2. Sheldon Davis, Dimitrina Stavrova, Covering properties of Symmetrizable spaces, Comptes rendus de l'Acade'mie bulgare des Sciences Vol 62 No8, 2009, pp.923-928. http://www.proceedings.bas.bg/

3. Separation pseudocharacter and cardinality of topological spaces, Topology Proceedings, vol 25, Summer 2002, 333-343. http://topology.auburn.edu/tp/reprints/TPauthorIndex2.htm

4. J.Dontchev, S.Popvassilev, D.Stavrova, On the η-expansion for the co-semi-regularization and mildly Hausdorff spaces, Acta Mathematica Hungarica, v.80 (1-2) 1998, 9-19. http://www.akkrt.hu/main.php?folderID=1601&articleID=3896&ctag=articlelist&iid=1

5. Cardinal invariants for topological spaces with a selected subset - an unified approach, Comptes rendus de l'Academie Bulgare des Sciences, v.50:11, 1997, 5-8. http://www.proceedings.bas.bg/

6. Unified approach to the theory of topological cardinal invariants, Comptes rendus de l'Academie Bulgare des Sciences, v.50:6,(1997), 5-8.

7. Improvements of cardinal inequality for topological spaces and k-structures, New Zealand Journal of Mathematics, v24 (1995) , 81 - 86 . MR96j:54007 (J.M.Aarts) http://nzjm.math.auckland.ac.nz/index.php/New_Zealand_Journal_of_Mathematics

8. Archangel'skij inequality without Hausdorfness, Comptes rendus de l'Academie Bulgare des Sciences, v.48 no7, 1994, 23-24. http://www.proceedings.bas.bg/

9. A.A.Gryzlov and D.N.Stavrova, Cardinal functions or topological spaces with a selected subset, Commentationes Mathematicae Universitatis Carolinae, v.35:3 (1994), 525-531. MR95m:54004 (Gary Gruenhage); Zbl 869.54007. http://www.karlin.mff.cuni.cz/cmuc/cmucemis/cmucemis.html

10. Cardinal functions for k-structures, Publications Mathematicae Debrecen, v.44, fasc.3-4, 1994, 359-366; MR95e:54008;Zbl 851.54004. http://www.math.klte.hu/publi/

11. Upper bounds for cardinality of topological spaces with a select subset, Bolyai Society, Mathematical Studies,4 ; Topology with Application, Szekszard (Hungary),1993, pp 445-448. MR96m:54009 (A. H. Stone); Zbl 884.54003 (Lj.Kocinac).

12. A.A.Gryzlov and D.N.Stavrova, Topological spaces with a selected subset - cardinal invariants and inequalities, Comptes rendus de l'Academie Bulgare des Sciences, v.46 no7, 1993, 17-19 .Zbl 809.54002 (J.Nikiel). http://www.proceedings.bas.bg/

13. Cardinal functions and inequalities for topological spaces and k-structures, Comptes rendus de l'Academie Bulgare des Sciences, v.46 no7, 1993, 13-16 ; Zbl797.54009 . Zbl 797.54009.

14. Archangel'skii's theorem a la Zorn, Comptes Rendus de l'Academie bulgare des Sciences, 1993, v.46, no1, 17-18 ; MR95d:54005 (from the text); Zbl 826.54021 (from the text).

15. On the cardinality of topological spaces, Questions and Answers in General Topology ,1993, v.11 no 1, 127-132 ; MR94a:54013 (L.Kocinac); Zbl 816.54002 (K.Iseki) . http://qagt.za.org/home
16. A.Archangel'skii and D.N. Stavrova, On a common generalization of k-spaces and spaces with a countable tightness, Topology and Its Application, v.51, 1993 , 261-268. ; MR94g:54001 (Michael Tkacenko); Zbl 846.54002 (E.R.Unger) .
http://www.elsevier.com/wps/find/journaldescription.cws_home/505624/description#description
17. On a theorem of de Groot about cardinality of topological spaces, Comptes rendus de l'Academie bulgare des Sciences, v.45 ,no 11, 1992, 5-6. ;MR94k:54005 (Richard Wilson); Zbl 785.54003 .
18. A new inequality for the cardinality of topological spaces , Mathematics and mathematical education, Proceedings of he 20th Spring Conference of the Union of Bulgarian Mathematicians , 1991, Sofia, Bulgarian Academy of Sciences, 1991, 142 -144.
19. On a generalization of Lindelof number for topological and neighbourhood spaces, Mathematics and mathematical education, Proceedings of the 18th Spring Conference of the Union of Bulgarian Mathematicians , 1989, Sofia, Bulgarian Academy of Sciences, 1989, 197-200; MR90h:54003 (Richard Wilson).
20. On some more cardinal invariants and inequalities for neighbourhood spaces, Mathematics and mathematical education, Proceedings of the 16th Spring Conference of Union of Bulgarian Mathematicians, 1987, Sofia, Bulgarian Academy of Sciences, 1987, 273-278; MR90e:54005 (P.A.Biryakov); Zbl 638.54005; RJ1987:12A491 .
21. H-closed neighbourhood spaces, Mathematics and mathematical education, Proceedings of the 15th Spring Conference of the Union of Bulgarian Mathematicians, 1986, Sofia , Bulgarian Academy of Sciences, 1986, 301 - 306 ; MR88g:55008 (Mohammad Ismail); Zbl 618.54022 ; RJ1987:3A568 .
22. B.Pasynkov, D.N.Stavrova and L. Bobkov, On spaces that are near to the locally finite dimensional ones, Proceedings of the Tiraspol Topological Symposium, 1985, 25 - 26. (in Russian)
23. On submetrizability of separable normal strongly o-metrizable spaces, Mathematics and mathematical education, Proceedings of the 14th Spring Conference of Union of Bulgarian Mathematicians , 1985, Sofia, Bulgarian Academy of Sciences, 1985, 289 - 290; MR87c:54040 (summary) ; Zbl 592.54029 (summary) ; RJ1985:10A518 .
24. Co-Hausdorff o-metrizable spaces and cardinal invariants, Berichte der Mathematisch-Statistischen section in der Forschungsgeschlischaft Joannem, Graz, no 239, 1985. MR87d:54056(R. Hodel) ; RJ1985:12A558 .
25. The theory of cardinal invariants for neighborhood spaces, Pliska, Bulgarian Mathematical Studia, v.6, 1983, 47 - 62; MR85j:54002 (Roman Fric);
Zbl 573.54003; (in Russian) http://www.math.bas.bg/~pliska/
26. Two theorems about the cardinality of neighborhood spaces, Mathematics and mathematical education, Proceedings of the 10th Spring Conference of the Union of Bulgarian Mathematicians, 1981, Sofia, Bulgarian Academy of Sciences, 1981, 190-194 ; Zbl 538.54002 (J.Ceder); in Bulgarian; English translation available)
27. Cardinal invariants for neighborhood spaces - definitions and main relationships, Comptes rendus de l'Academie bulgare des Sciences, v 33 no 4, 1980, 453-456; MR81m:54014 (Zoltan Balogh); Zbl 477.54001. (in Russian ; English translation available)
28. Normal nonmetrizable Moore spaces, Comptes rendus de l'Academie Bulgare des Sciences, v.29, no 3, 1976, 295 - 297 ; MR56#14431(1977) (J.N.Younglove); Zbl 358.54010 (Jacob Cofner). (in Russian; English translation available)

Other:

1. Compactness-like properties in symmetrizable spaces (jointly with Sheldon Davis) – abstract, AMS Meeting, Phoenix, 2004.

2. Cardinality of o-metrizable and symmetrizable spaces – abstract, AMS Meeting, San Diego, 2002

3. Hausdorff pseudocharacter and cardinality of topological spaces with a selected subset , 1993, preprint, the abstract appeared in the Abstracts of the Topological International Conference, Trieste, Italy, 1993.

4. Cardinal functions in topological and more general spaces, Proceedings of International Conference on Topology, Varna, 1990.

In preparation:

1. Butterfly homology in computer graphics

2. About homogeneous spaces and the Baire property of remainders (jointly with S.Nedev, M. Coban, E. Mihailova)

3. Characterization of strong paracompactness via selections and factorizations (jointly with S.Nedev, M. Coban, E. Mihailova).

Dimitrina Stavrova

TEACHING STATEMENT

For me, teaching is a way of life and a way to enrichment. A lecturer is blessed with the opportunity to always work with one age group. As if time has stopped and yet changes are continually happening since new students with new attitude, preparation and knowledge are coming. One has to be alert and ever changing – what has previously worked, might not at all work with the next year students. And every new class challenges you to "prove" yourself as a teacher and as a professional.

Teaching has always been a rewarding experience for me. I enjoy preparing lessons and building models to present in the lecture. I like the challenge of teaching the entire class as much of the curriculum as possible. I often see my students outside the class, both to discuss the course and their interests in general. I am a careful grader, giving extra credit only for extra work that the entire class is invited to try. I usually ask my students to be able to present their homework problems explaining why each step works in the most understandable manner as possible.

When I am assigned a course, I first examine the curriculum and the text book. I talk to teachers that have taught the course before and I check how the course is used as a prerequisite to other subjects. I then write a detailed schedule of the entire semester's lectures based on this information. I also type up a grading policy which fits with the department's and emphasises the most important aspects of the course. I try to have the grade reflect the amount of knowledge the student has acquired and not their test-taking ability. The schedule of tests and quizzes as well as my grading policy are given out at the first class meeting. My students vary from Math/Computer Science/Informatics majors, to Chemistry and Physics Majors (at Sofia) as well as all kinds of majors at Miami University (mostly business and law majors).

Throughout my teaching experience at Miami University, Oxford, OH, I have also had students with a wide variety of backgrounds taking the same course. I have taught freshmen with advanced placement from high school in the same class with sophomores that have gotten a C- in the prerequisite. Some of my Calculus students have had extremely low self esteem while others were so confident they didn't even see their own mistakes. I don't let the class slow down for the less prepared students. Instead, I sometimes give students a take-home diagnostic exam at the first meeting. During the first lecture, I review the key prerequisite subjects with the class. After a test, I go over it rapidly during the second meeting and give detailed solutions to be studied at home. Sometimes I assign homework to the students with incorrect answers to the test. I also add extra office hours at this point to meet with students and go over their problems in more details.

I try always to present proofs in class admitting when a proof is thorough or not. I try to get the students first to understand the idea of the proof. I also try to explain the ideas behind both the definitions of mathematical concepts and the techniques used to solve the problems. When I am lecturing I present problems in a lot of detail. I tend to provide as many steps as possible without just crossing out cancelled parts of equations. I don't skip trough the algebra in calculus course because I have found that many students get nervous if they don't see every step, even if I assure them that they could fill in the details themselves. I try to watch their faces for signs of confusion and will call on a student by name to ask a question if I think they have one. I usually memorise my students' names very quickly and this helps me a lot in building up a mutual understanding and confidence.

In Calculus classes I give weekly quizzes to keep the class up to date. These quizzes consist mostly of problems similar to the examples I have presented and the homework plus one extra credit more challenging problem that requires some creativity. My final exams are, testing the student's ability to do every technique learned without scaring them with time pressure and strange applications.

When facing a class in the undergraduate level, I have been trying to put curriculum issues in familiar contexts, present problems as puzzles and spice the lectures monotony what usually results in student paying more attention. Concise explanations usually precede rigorous proofs. I try to choose examples so that they range from very easy to quite long and involved. Finally, I emphasize that the development of symbolic manipulation software packages and numerical techniques made the ability to carry through a lengthy computation a much less important skill than the ability to translate a problem into the mathematical language.

By contrast to the undergraduate teaching, upper division and graduate math classes include a large number of motivated and competent students. In these classes I try to convey my enthusiasm about the subject; since we are in mathematics because we like it (certainly the profit motive is easily excluded), we may as well show this in out lectures. Although detailed proofs are sometimes omitted, I stress the importance of understanding why a method works, or why a theorem holds. I encourage student engagement by introducing examples from other sciences, problems from Math competitions, sometimes easily formulated, simple but still unsolved Math problems.

Teaching a graduate or an advanced undergraduate course, i.e. a course addressed to an audience of future professionals or at least serious learners who plan to use the subject in their future professional work, has a double purpose.

On the one hand, there is a certain body of advanced material (notions, proofs, etc.) to be presented and learned by the members of the audience. At the plain level this means that the students should be able to reproduce the proofs and apply results in certain situations (solving problems). On the other hand, such a course is an opportunity to teach students certain ways of thinking in mathematics where specific material serves a purpose somewhat akin to the subject matter for a figurative painter.

These two tasks are not necessarily in tune. The real challenge here is to achieve a proper synthesis. Sometimes a very clear and polished presentation hides the well-springs of the argument and does not teach students how the facts can be FOUND not just LEARNED. Such a presentation may be replaceable by an equally well written book. On the other hand, a muddled presentation which for the teacher may seem to be a road toward the discovery of truth usually distracts and confuses students who do not yet see the ``big picture''.

My favored approach is to emphasize the ``big picture'' upfront, often skipping even essential details at first and bringing the students' attention to the structural and logical elements which will play key roles in the development. After that the picture gets filled in, sometimes straightforwardly using the most elegant or most useful available arguments (I like sometimes while preparing a lecture to figure out proofs of even standard results rather than look them up in a book), sometimes with a bit of the Socratic method with students reaching certain conclusions themselves. Given a choice I would rather spend time on key motivations and applications and let students read the technical arguments.

I have taken part into several groups designing curriculum for different types of Math majors or Chemistry, Physics majors (such as Pure Mathematics, Computer Sciences, Applied Mathematics, Informatics, High School Math Teachers etc). Mine main responsibility was to fit in Calculus/Analysis courses and synchronised them with other courses taught. I took part into the TEMPUS granted project about implementation of MATHEMATIKA in laboratory calculus classes.

I have designed several Topological courses. After returning to Sofia University from USA, I was asked to develop a new course for students in Informatics/Computer Science that gives clear interaction between purely theoretical subject and direct applications. These lead to the development of the course in Computational Topology – a rapidly developing field of implementing topological methods in image processing, surface reconstruction and robotics. This includes calculating and combining the number of credits and fitting together the material taught.

RESEARCH STATEMENT AND PLAN

Dimitrina N.Stavrova

Published research: I have about 30 published papers in the field of General and Set-Theoretic Topology. Most of my papers are about cardinal invariants of topological and/or more general spaces. The most recent one is a joint paper with Sheldon Davis, University of Tyler, TX (previously at Miami University, Oxford, Ohio) about some covering properties of symmetrisable spaces that are closely related to the cardinal invariants theory. Such properties for example are – weak Lindelofess, almost weak Lindeloffnees , H-closedness etc. It is well known that in metrizable spaces all these (and others) covering properties are equivalent. We investigated if this is so in symmetrizable space and give several examples showing that this is not the case. We have constructed an example of Hausdorff symmetrizable H-closed space that is not compact; an example of weakly Lindelof, not almost Lindelof symmetrizable space; an almost Lindelof symmetrizable space of arbitrary big cardinality etc.

Many of my papers are devoted to strengthening some well known cardinal inequalities or proving analogues of others. In [4] I have introduced a new cardinal invariant – the so called Urysohn pseudocharacter $U\psi(X)$ and proved that if combined with almost Lindelof degree it gives a restruction of space cardinality. This strengthens a cardinal inequality proven by Bella and Cammaroto. In the same paper one of my joint results with A. Gryzlov has been also improved. In [9] a new separation axiom was defined and the famous Arhangelski inequality about the cardinality of Hausdorff Lindeloff spaces with countable pseudocharacter and tightness was improved. This result is of particular interest because the problem of cardinality of T_1 such spaces has not yet been resolved. Yet another result I would like briefly to mention is [19] where improvement of the well known De Groot's cardinal inequality has been improved and a partial answer to a question of I.Juhasz has been obtained. I suppose that the above mentioned result give good idea about my research work up to date and will concentrate on the problems that I am interested in.

Research plans: These problems are in areas in which I have made contributions to or I have specific interest: problems in certain generalised metric spaces; problems involving the Lindelof-type properties and (pseudo)character or other local-type cardinal invariant properties and application of the method of elementary submodels to topology; Computational Topology. Some of my results have also been discussed.

Several of the questions are well-known open problems for which any significant progress, even if not a full solution would be of interest.

I. Problems for general spaces involving Lindelof degree or other Lindelof-type properties and pseudocharacter or other local-type cardinal invariant properties.

General note: For clarity, I will usually state the countable versions of the problems; but for most of them, the higher cardinal versions are also unsolved.

1.1. One of the most interesting and not yet completely solved problem in the theory of cardinal functions is: Are the Lindelof number and the pseudocharacter enough to

calculate the cardinality of a given Hausdorff topological space? In particular, must Hausdorff Lindelof spaces with each point $G\delta$ have cardinality $\leq \exp\omega$?

If the space also has countable tightness, a positive answer is given by A. Arhangel'skij [A1]. The answer was also shown to be positive for T/1 compact spaces by Gryzlov [G]. A consistent negative solution was obtained by S. Shelah, who constructed, by forcing, a model in which GCH holds and there is a Lindelof points $G\delta$ space of cardinality $\omega 2$. I. Gorelic later obtained a simpler construction. C. Morgan extended it to show the consistency with GCH of a Lindelof points $G\delta$ space of cardinality $\omega 3$ (hence $> \exp\omega 1$) but he found a gap in his construction and thus the problem was still unsolved in that case.

The following questions remain open and are on my research agenda:

(i) Are there examples in ZFC with any of the above properties?
(**ii)** Must Lindelof first countable T/1 -spaces have cardinality $\leq \exp\omega$? - There are not even consistency results known here; it is possible some generalization of Gryzlov's theorem for the compact case may yield a positive ZFC solution.
(iii) Does GCH imply that Lindelof points $G\delta$ spaces have cardinality $< \Im\omega$?
(iv) What minimal (in some sense) cardinal invariant properties could be added to Lindelof degree and pseudocharacter to obtain useful positive results (as it is shown in [AS] such a role could be played by k-tightness introduced there) ?

1.2. There are some generalisations of Arhangel'skij's result mentioned above involving notions weaker than Lindelof. For example, Bell, Ginsburg, and Woods [BGW] showed that a normal space X has cardinality $\leq \exp\omega$ if X is first countable and weakly Lindelof (i.e., every open cover contains a countable subset with dense union). It is an open question if this holds for completely regular spaces.

1.3. Another Lindelof-type property was introduced by A.Arhangel'skij in [A2]. He showed that quasi-Lindelof first countable regular spaces have cardinality $\leq \exp\omega$ and asked if the same is true for Hausdorff such spaces. Recently O.Alas [Al] was able to weaken the regularity to Urysohn property but the main question remains open .

1.4. I have obtained a result [S1] using the notion of the k-structures of R.Hodel [H1], unifying proofs of many known results in the theory of topological cardinal invariants and partition calculus. More work in this direction should be of interest, especially developing the relations with partition calculus and other infinite-combinatorial theorems .

1.5. In [AG] A.Arhangel'skij and Hamdy Gennedy started the theory of relative topological properties. In [GS1] and [GS2] A.Gryzlov and myself obtained many relative version of the well-known and important theorems on cardinal invariants. In a recent paper, Arhangel'skij [A3] continued this line of investigation developing a generic approach to this topic and posing many new and interesting problems. A different approach has been developed in [S2] where a result is obtained from which all known results in a given area in the theory of topological cardinal invariants follow. Combining the two methods solutions to open problems in this field will be searched.

1.6. Arhangel'skij and myself [AS] introduced the notion of k-tightness, and used it to generalise some cardinal inequalities. An interesting problem left open in that paper is the following: Suppose X is regular and whenever a point p is in the closure of a subset A

of X, then p is in the closure of some å-compact subset of A . Must X have countable tightness?

1.7. Finally - completely different problem: I.Juhasz has recently introduced the following cardinal invariant (for regular topological spaces) : $\lambda(X)$ is the minimal cardinal τ such that there is a base B for X such that every B in B is the union of τ-many members of B whose closures are contained in B. He asked if $\lambda(X)$ countable implies that X is completely regular. An answer to this question could lead to a new inside characteristic (there is only one known up till now) of completely regular spaces.

II. Problems involving generalised metric spaces.

There are several long standing open problems involving cardinal invariants of symmetrizable spaces that I would like to investigate, too. Recall that a symmetric d on a space X is a function from XxX to the non-negative reals which satisfies all the properties of a metric except the triangle inequality, and that a space X is symmetrizable if there is a symmetric on X such that a subset U of X is open iff U contains a ball of positive radius about each of its points.

2.1. Nedev [Ne] showed that every hereditarily separable symmetrizable space is hereditarily Lindelof and that every Hausdorff symmetrizable Lindelof space is hereditarily Lindelof . A.V.Arhangel'skij [A4] asked if every hereditarily Lindelof symmetrizable space is hereditarily separable...i.e., is there a symmetrizable L-space? Shakhmatov [S] obtained a consistent counterexample, but it is still not known if there is a ZFC example. A proof that it is consistent that there is no open question of whether or not it is consistent that no L-spaces exist at all.

The following three problems are long standing and absolutely "untouched" i.e. nothing has been done since they were posed by A.Arhangel'skij in the early seventies:

2.2. Does every symmetrizable ccc Hausdorff space has cardinality $\leq \exp\omega$?

2.3. (D.Stavrova) Does every symmetrizable Lindelof space has cardinality less or equal to continuum? (a positive solution would be some kind of cross-breed between the theorem of de Groot and symmetrizable spaces i.e. symmetrizable might help the lack of Hausdorfness). What is the cardinality of a T_1 symmetrizable Lindelof space ?

2.4. What is the cardinality of every normal symmetrizable weakly Lindelof space?

2.5. Is every psudocompact symmetrizable space metrizable?

III. Problems in Computational Topology.

Investigating the use of recently introduced and studied by several people at Georgia Tech, notion of cubic homology [KMM] in persistence theory developed by Afra Zomorodian [Z]. Unifying butterfly topologies, butterfly meshes and (possibly introducing) butterfly homology.

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