

Newsletter of IMPAN



DEPARTMENTS
continuation

IN MEMORY
of Aleksander
Petczyński

SCIENTIFIC
EVENTS



Departments

LIST OF DEPARTMENTS AND LABORATORIES AT IMPAN:

Departments: (1) Algebra and Algebraic Geometry, (2) Biomathematics (3) Differential Equations, (4) Dynamical Systems, (5) Foundations of Mathematics, (6) Functional Analysis, (7) Mathematical Physics and Differential Geometry, (8) Mathematical Statistics, (9) Number Theory, (10) Probability Theory and Mathematics of Finance, (11) Topology.

Laboratories: (1) Hilbert Spaces, (2) Noncommutative Geometry, (3) Numerical Analysis.

Departments: (1), (4), (6), (7), (8), (9), (10) were presented in the first issue of IMPAN Newsletter. Departments: (5), (11), (3) and Laboratories: (2), (3) were described in the second issue of IMPAN Newsletter.



↑ Magnolias in PAN Botanical Garden, May 2013,
photo by F. Przytycki

Biomathematics Head: Ryszard Rudnicki



The Department of Biomathematics is located in Katowice Branch of IMPAN, situated in the premises of Silesian University.

The Katowice Branch was founded in 1966 and its first head was Jan Mikusiński. At that time the main area of research was the theory of generalized functions.

Since 1994 the branch has changed its scientific profile and now it conducts research in probability theory, partial differential equations and biomathematics.

The department has one permanent employee: prof. Ryszard Rudnicki, one temporary employee: prof. Adam Bobrowski, and two PhD students: Przemysław Paździorek and Paweł Zwoliński.

Several consecutive grants by Polish Ministry of Science and Higher Education have been carried out in the department, the recent ones include:

- *Deterministic and stochastic methods in biological models*, 2011–2014, coordinator: Ryszard Rudnicki,
- *Convergence and approximation of semigroups of operators in models of mathematical biology*, 2011–2014, coordinator: Adam Bobrowski.

The department co-organized 8th European Conference on Mathematical and Theoretical Biology, June

28 – July 2, 2011, Cracow. This meeting brought together almost thousand mathematician and scientists from 48 countries (*see issue 1 of Newsletter of IMPAN for more details*).

The department runs the weekly Seminar on Biomathematics in Katowice (Thursdays, 12:15–13:45) and the monthly seminar "Computational Biology" in Warsaw.

SELECTED RECENT PUBLICATIONS:

- J. Banasiak, K. Pichór, and R. Rudnicki, *Asynchronous exponential growth of a general structured population model*, Acta Applicandae Mathematicae, 119 (2012), 149–166.
- R. Rudnicki, *Chaoticity and invariant measures for a cell population model*, J. Math. Anal. Appl. 393 (2012), 151–165.
- Bobrowski, *Lord Kelvin's method of images in the semigroup theory*. Semigroup Forum 81 (2010), 435–445.

Laboratory of Hilbert Space Operators

Head: Jan Janas

The Laboratory of Hilbert Space Operators has a long tradition (since 1971). Its first head was Włodzimierz Mlak. Every week, the Laboratory organizes one seminar on Operators in Hilbert Spaces in Cracow Branch of the Institute (together with colleagues from AGH University of Science and Technology and the Agricultural University in Cracow).

In the last 15 years the main area of research has concerned spectral analysis of Jacobi operators (bounded or not) in l_2 . This research was supported by grants of the Ministry of Higher Education; the last one includes: *Asymptotic and perturbation methods in spectral analysis of discrete systems*, 2007–2010, (coordinator: Jan Janas).

Younger mathematicians were working on inverse problems for quantum graphs (Marlena Nowaczyk) and various classes of composition operators in L_2 (Piotr Budzynski).

SELECTED RECENT PUBLICATIONS:

→ P. Budzyński, J. Stochel, *Joint subnormality of n -tuples and CO -semigroups of composition operators on L_2 -spaces*, II, *Studia Mathematica*, 193 (1) (2009), 29–52.

→ J. Janas, S. Naboko and G. Stolz, *Decay bounds on eigenfunctions and the singular spectrum of unbounded Jacobi matrices*, *Int. Math. Res. Notices* (2009), no. 4, 736–764.

→ A. Boutet de Monvel, J. Janas and S. Naboko, *Unbounded Jacobi matrices with a few gaps in the essential spectrum. Constructive examples*, *Integral Equations and Operator Theory* 69 (2011), 151–170.

→ J. Janas and M. Moszyński, *Spectral analysis of unbounded Jacobi operators with oscillating entries*, *Studia Mathematica* 209 (2012), 107–133.



IMPAN PRIZES

IMPAN prizes, see <http://www.impan.pl/EN/Awards/>

→ **IMPAN Scientific Prize** in 2013 was awarded to Grzegorz Karch for outstanding results concerning existence and properties of solutions of nonlinear partial differential equations, inspired by physical, chemical and biological problems. Professor Grzegorz Karch works at the Institute of Mathematics of the University of Wrocław. He is the author of more than 50 papers and a laureate of Polish Mathematical Society Stanisław Zaremba Price in 2005.

→ IMPAN Scientific Prize is awarded by IMPAN Director yearly since 2009, for outstanding achievements in mathematics.

→ Dr Wojciech Samotij is **Kuratowski Award** winner in 2013. He is awarded for outstanding results in combinatorics and graph theory. Wojciech Samotij received master's degrees in mathematics and computer science from the University of Wrocław in 2007 and PhD at the University of Illinois at Urbana-Champaign in 2010. Now he is a post-doctoral researcher at the School of Mathematics at Tel Aviv University and junior research fellow at Trinity College, Cambridge.

→ Kuratowski Award was established in 1981 by the daughter of Professor Kazimierz Kuratowski, Professor Zofia Kuratowska. It is awarded yearly for mathematicians under 30 years old, by the Institute of Mathematics of the Polish Academy of Sciences and the Polish Mathematical Society.

IMPAN



in ECRYPT:

European Network of Excellence in Cryptology

Institute of Mathematics participated in two European collaboration projects in Cryptology during last nine years. These activities reflected a considerable effort undertaken by last three directors of the Institute: to broaden the scope of the research in the direction of contemporary applied mathematics.

Cryptographic technologies are at the heart of information society. The rapid growth of Internet and electronic commerce is directly related to widespread use of cryptography in electronic communications. However, despite more than 60 years of mathematical cryptography, there is no publicly known complete mathematical proof of strength for any practical cipher. Also, despite rapid development of cryptography for practical applications, there are only relatively few mathematicians involved in cryptography studies in Central Europe.

European Network of Excellence in Cryptology ECRYPT was founded by the European Commission under FP6-IST (VI Framework Program) from 2004 to 2008, and the subsequent follow-up Phase II network, ECRYPT II, was founded under FP7-IST from 2008 to 2013. Over forty university groups, research organizations, and corporations from 13 EU countries, Norway, Switzerland, Taiwan and USA participated in network activities.

The Institute of Mathematics was the only network member from “new” EU member states which joined European Union in 2004. ECRYPT was also one of the first FP6 projects in which Poland participated as a full member state. The research program covered active research area of contemporary cryptology including design and cryptanalysis of ciphers and hash functions, development of cryptoanalysis tools, watermarking, security of embedded cryptosystems, lightweight cryptography for industrial and public services applications, and design of security protocols.

Activities of the network included conferences, workshops, research schools, virtual labs, and research visits. IMPAN organized two ECRYPT events: Conference on Hash Functions in 2005 and Tools for Cryptanalysis Workshop in 2007.

Both ECRYPT and ECRYPT II networks were coordinated by Katholieke Universiteit Leuven in Belgium under excellent chairmanship of Professor Bart Preneel. The total EU contribution to ECRYPT networks was 8.6 million Euro.

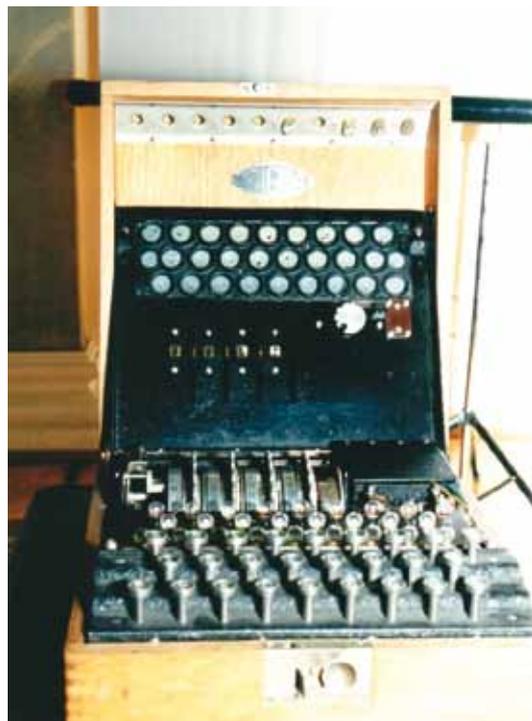
Our membership in ECRYPT was possible due to the earlier effort to broaden the scope of research into the direction of cryptology, undertaken at the Institute by late Jerzy Urbanowicz and his collaborators, and then, thanks to important help and encouragement of our European colleagues. In particular late Professor Hans Dobbertin from Ruhr University in Bochum, one of the ECRYPT founders, who recognized importance of reestablishing Polish presence in the mainstream research in cryptology, actively supported and argued for our participation in the network.

In the Foreword to the Proceedings of The International Conference on Public-Key Cryptography and Computational Number Theory held at the Banach Center in Warsaw in September 2000, prominent American-Polish mathematician Andrzej Odlyzko wrote that: “The start of the 21st century is a golden age for applications of mathematics in cryptology. The beginning of this age can be traced to the work of Marian Rejewski, Jerzy Różycki and Henryk Zygalski on breaking Enigma. Their work [...] represented a major increase in the sophistication of the mathematical tools that were used”. ECRYPT networks considerably helped our mathematical community to continue and to expand these best traditions.



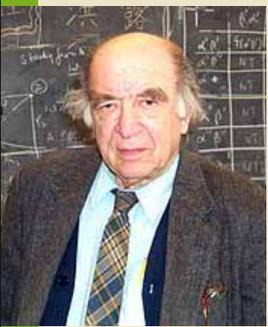
↑ Institute of Mathematics organized a Symposium to commemorate Enigma code breaking achievement by Polish mathematicians and to present original Enigmas which are collected by the Museum of Polish Army. From the left: Stanisław Spież (IMPAN), Monsignor Józef Maj, Jerzy Urbanowicz (IMPAN), Aleksander Wittlin (IMPAN), Witold Kulesza (The Institute of National Remembrance), minister Ewa Kulesza, General Inspector for Personal Data Protection, unknown, Łukasz Turski (Center for Theoretical Physics).

→ Enigma, German war time coding machine. This original example was presented by Prince of York to the Polish Government. Prince Andrew handed over an Enigma machine as a „symbol of gratitude” and recognition by Great Britain of Poland’s pivotal role in cracking Nazi Germany’s Enigma code. Three Polish mathematicians – Marian Rejewski, Jerzy Różycki and Henryk Zygalski broke the Enigma code in 1933.



Scientific Events

IV Hurwicz Workshop on Mechanism Design Theory 16.11.2012 – 17.11.2012 | Warsaw



↑ source: Wikipedia

The 2012 Hurwicz Workshop on Mechanism Design Theory was a continuation of the initiative started in 2009 and continued in 2010 and 2011 of holding an annual conference to honor Professor Leonid Hurwicz. Leonid Hurwicz lived in Warsaw until 1938 and studied at the University of Warsaw. He frequently visited Poland in 1990's. Hurwicz is often credited with introducing rigorous mathematical approach to economic analysis. He received the Nobel Prize in Economic Sciences in 2007 for his fundamental contributions to the theory of the design of economic mechanisms. Theory of mechanism design relies heavily on mathematical methods of functional analysis, differential equations, differential topology, dynamical systems, etc. He has made important contributions to mathematics as well as economics, in particular, to non-linear programming. The previous Hurwicz Workshops had an interdisciplinary focus with presentations of topics

ranging from macroeconomic issues to mathematical game theory and stochastic finance.

The aim of the 2012 Hurwicz Workshop was to bring together scholars from Poland and from abroad who specialize in mathematical approach to economic theory, including, but not necessarily confined, to the mechanism design theory. The Workshop provided them with a forum for presenting their research to an audience with expertise in mathematics and economics, as well as for informal discussions. Continuing the tradition of the previous 2009, 2010 and 2011 Hurwicz Workshops, the program included a Hurwicz Memorial Lecture, which was delivered in 2012 by Professor Ramon Marimon from EUI in Florence. Professor Marimon's visit to Warsaw was sponsored by the National Bank of Poland. The organizers expected that the workshop contributed to popularization of the mathematical approach to economic analysis in Poland. The first

→ Prof. A. Strasburger
and Prof. R. Myerson,
III Hurwicz Workshop on
Mechanism Design Theory,
1–2 July 2011, Warsaw





↑ From the left (in the foreground): dr M. Karpowicz, Prof. M. Sablik, participant of the Workshop from Greece, dr U. Grzybowska, Prof. A. Strasburger, Prof. R. Myerson, Prof. W. Kosiński, Prof. A. Jakimowicz, Prof. Ł. Stettner. From the left (in the background): Prof. J. Werner (III Hurwicz Workshop on Mechanism Design Theory, 1 – 2 July 2011, Warsaw)

Hurwicz Memorial lecture in 2009 was delivered by Professor Stefan Rolewicz (IMPAN). It is worth to point out that 2010 Hurwicz Memorial Lecture was given by Professor Eric Maskin, while 2011 Lecture by Professor Roger B. Myerson, who shared 2007 Nobel Prize with Leonid Hurwicz.

The organizers of Hurwicz Workshops were: Banach Center and Mathematical Center for Science and Technology at IMPAN, together with Warsaw School of

Economics (in 2009 and 2012), and together with Warsaw University of Life Sciences (in 2010 and 2011). All workshops were organized in cooperation with Professor Jan Werner (Department of Economics of the University of Minnesota). The visits of Nobel Prize winners: Professor Eric Maskin and Roger B. Myerson were sponsored by the Polish Financial Supervision Authority.

Leonid “Leo” Hurwicz (August 21, 1917 – June 24, 2008) was a Polish-American economist and mathematician of Jewish descent, born in Moscow, Russia, a few months before the October Revolution. The family had its origins in Poland and had lived in Congress Poland (the part of Poland then within the Russian Empire). He graduated from the University of Warsaw in 1938 with a degree in law, originally intending to follow in his father’s footsteps. However, beginning in his second year of law school, he’d taken some obligatory economics courses and became more interested in this discipline than any other. He continued to study economics in Geneva and then he moved to Chicago, which allowed him to avoid atrocities of the World War II. He originated incentive compatibility and mechanism design, which show how desired outcomes are achieved in economics, social science and political science. Interactions of individuals and institutions, markets and trade are analysed and understood today using the models Hurwicz developed. To date, Leonid Hurwicz is the oldest Nobel Laureate, he received the prize at the age of 90. Hurwicz was Regents’ Professor of Economics (Emeritus) at the University of Minnesota. He was among the first economists to recognize the value of game theory and was a pioneer in its application. Hurwicz shared the 2007 Nobel Memorial Prize in Economic Sciences with Eric Maskin and Roger Myerson for their work on mechanism design.

Horizons In Mathematics 15.04.2013 – 19.04.2013 | Będlewo

The conference Horizons of Mathematics, organized and financed by Warsaw Center of Mathematics and Computer Science, took place in Będlewo, April 15th-19th.

83 undergraduate students from 12 Polish universities listened to 22 talks of some of the best Polish specialists in mathematics and computer science. This was the first week of good weather this year, so the traditional bonfire with barbecue (no meeting in Będlewo can omit this event) was successful, as well.

The main goal of the conference was to popularize our branch of science, but on a slightly higher level than

usual. We did not need to popularize mathematics as such – the students were already studying mathematics. We tried to popularize the idea, that mathematics and computer science are sufficiently interesting to practice them whole your life (as opposed to learning them and then using this knowledge in other paths of life). To assure the students that mathematics is not only interesting, but also profitable, the universities were also advertising their PhD studies.



New European Union FP7 Programmes at IMPAN

→ **IMPACT**. This is 5-years programme offering individual postdoc fellowships at IMPAN, co-financed by EU through the Marie Curie Action „Co-funding of regional, national and international programmes (COFUND)”. It offers yearly 2 positions in all areas of mathematics practised at IMPAN. Deadline for applications for the year 2013/14 was May 5. Coordinators: P. Hajac, F. Przytycki, A. Sitarz. For more information see: <http://www.impan.pl/~impact/>

→ **AOS (Asymptotics of Operator Semigroups)**. This is Marie Curie Action of type: International Research Staff Exchange Scheme (IRSES). Time: 01.11.2012 – 31.10.2016. Coordinator: Y. Tomilov.

→ **FLUX**. This is also IRSES type action and has full name: **Towards Regularity**. Time: 01.01.2013 – 31.12.2016. Coordinator: W. Zajączkowski.

Workshop on set theoretic methods in compact spaces and Banach spaces

17.04.2013 – 21.04.2013 | Warsaw

The conference took place in the days 17–21 of April, 2013 at the Banach Center of the Institute of Mathematics of the Polish Academy of Sciences and focused on the applications of the set theoretic methods in the interaction between the Banach spaces theory and topology.

This included both the advances concerning appropriate set-theoretic tools from forcing theory, Ramsey theory, descriptive set theory or other branches of set theory as well as concrete applications of these methods in the mathematical practice.

The scientific committee consisted of: Antonio Avilés (Murcia), Piotr Koszmider (IMPAN – chair), Witold Marciszewski (Warsaw) and Grzegorz Plebanek (Wrocław). There were 27 talks, most of them lasting at least 40 minutes. The conference was attended by many young people, mostly graduate students from Poland and Czech Republic. One afternoon was devoted to a guided walk through the old city of Warsaw.

The talks can be divided according to the type of interaction between the topology of compact spaces and the structure of a Banach space, as well as according to the kind of infinitary combinatorial tools used.

A big group of talks was concerned with the weak* topology of the dual ball of a Banach space. Quite often this is a very useful tool for getting an insight into the geometry of Banach spaces. The talk of Professor Matias Raja from Murcia University entitled “Compact spaces of Szlenk index ω ”, or of Professor Piotr Borodulin Nadzieja entitled “Sequential closure in the space of measures” followed this line. One should note here that by the Riesz representation theorem, the dual of the Banach space $C(K)$ of all continuous functions on a compact Hausdorff space is isometric to the Banach space of Radon measures on K with the variation norm.

Other talks exploited the weak topology in a Banach space like the talk of Professor Marian Fabian from the Czech Academy of Sciences entitled “Projections in duals to Asplund spaces constructed without Simons’ lemma”.

Two interesting talks of Professor Anna Pelczar-Barwacz from Jagiellonian University entitled

“Examples of the Ferenczi-Rosendal list of minimality types of Banach spaces” and of a Colombian Ph. D. student from the Cornell University Diana Ojeda entitled “A norm for Tsirelson space” were related to the aftermath of Gowers’ discoveries from the 90ties concerning the applications of combinatorics in Banach space theory.

Professor Jesus Castillo from Universidad de Ex-tramadura gave us a fantastic talk on twisted problems. A Banach space X is a twisted sum of two others, if the quotient of X by the first is the third space, it is non-trivial one if the first space is not complemented in X . Professor Castillo in his talk entitled “Cardinals, set theory and twisted problems” talked about many open problems concerning twisted sums like if for any Banach space of the form $C(K)$ there is a nontrivial twisted sum of c_0 and $C(K)$.

Another breathtaking talk was given by Professor Stevo Todorčević from CNRS and Toronto, who received the CRM-PIMS-Fields Prize last year. His talk entitled “A construction scheme on ω_1 ” was devoted to a new presentation of the strength of Jensen’s diamond axiom. The new applications meant by Professor Todorčević concerns generalized bases in non-separable Banach spaces. These applications are only consistent with the usual axioms of set theory.

Also the talk of Professor Christina Brech from Universidade de Sao Paulo in Brazil concerned consistency result related to classical Banach spaces. A surprising new exciting link between metric dynamical systems and nonseparable Banach spaces and their dual balls with the weak* topology was presented by Professor Michael Megrelishvili from Bar Ilan University in Israel. These results form a growing new body of research. Many results presented by Professor Megrelishvili were obtained together with Professor Eli Glasner from Tel Aviv.

The slides of these talks and many other interesting presentations can be seen on the following website: http://www.impan.pl/~set_theory/Workshop2013/schedule/schedule0.html

IN MEMORY OF ALEKSANDER PEŁCZYŃSKI

A great thing happened in my life. A quarter of a century ago I met Aleksander Pełczyński.

It was an extraordinary moment for me. Looking back I can see clearly that I was in absolutely the right hands. During all those years he was for me – undoubtedly – the most important mathematician. Indeed, it was he who taught me mathematics, pointing out what is significant and passing on to me the criteria of beauty.

In my case, the mathematical culture which completely determines our approach to the subject, originates entirely from him. He was – and will remain forever – my great and peerless master. His mathematics was exceptionally appealing. He was able to ingeniously combine ideas from the distal ends of mathematics. He perfectly recognized the significance of problems, judging correctly what is important, what is beautiful, and what is just trifling and imitative. He was an excellent mathematician. Undoubtedly the Geometry of Banach spaces, to a large extent, owes him its present shape.

But he was also, and perhaps above all, a great man. Without exaggeration, I can say that he had a huge impact on me – also beyond mathematics. I calculated recently that I must have spent at least several thousand hours in his company. We had countless discussions on many topics, and very often mathematics disappeared into the background. These were always interesting and intelligent conversations. He always noticed something curious – most likely going against common opinion.

He liked all kinds of paradoxes. He was an erudite, fascinated with history. He always read historical books and liked to surprise people with curiosities which he uncovered. No conversation with him was dull.

But at the same time he was not at all intrusive. He could even be rather shy and was always making fun of himself. He was endowed with an extraordinary sense

of humor, simultaneously refined and not recognizing any taboos. But he did not offend with his wit, rather it was possible to appreciate him for it.

I remember a situation in some faculty, when seeing the librarian taking out a book despite the ban, which she herself had imposed, he pointed out that she was following Napoleon Bonaparte who first imposed the Continental Blockade on Europe and then imported beaver fur from Canada for the hats of his guards.

I will miss all of this very much. We were friends and I watched with fear as he slowly left us. I did not allow myself to think that one day he may no longer be among us, that I would not hear his jokes anymore, that I would not have someone to ask about the properties of Banach spaces (and always receive an accurate answer). And now that he has gone, it seems to me that he is still among us. I am sure that he will remain forever in our memories.

A few years ago, while talking about various things, I said that I doubted if it would be possible to understand the way we have consciousness – that it reminded me of Cantor's diagonal paradox.

Hearing this, Olek replied immediately, with a twinkle in his eye, saying something which had me lost in reverie and which, I think, I understood much later. He said “Ah! So you are a deep believer!”

Michał Wojciechowski

PASSED AWAY

Aleksander Pełczyński

(born 2.06.1932 in Tarnopol – passed away 20.12.2012 in Wrocław).

Professor Pełczyński worked at IMPAN since April 1956 till recently. He had full position at IMPAN since 1967 till 2002. For many years he was head of the Laboratory of Functional Analysis. He fulfilled various duties: in 1970-1973 he was IMPAN scientific director, in 1970-1978 he was a head of PhD studies.

He graduated from the University of Warsaw and in 1958 he made PhD under supervision of Stanisław Mazur. The title of his PhD dissertation was: *"Isomorphic properties of Banach spaces related to weak unconditional convergence of series"*. He worked at his alma mater in 1955-1967.

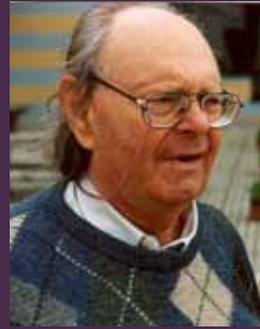
He was the only Polish mathematician after World War II invited to deliver a plenary talk at International Congress of Mathematicians. This took place in Warsaw in 1983.

In 1966 he had an invited talk, joint with B.S. Mitiagin, at ICM in Moscow. He is dr h.c. of Vrije Universiteit in Brussels, Universitaet Jena, Kent State University (Ohio, USA) and Adam Mickiewicz University in Poznań. In 2002 he received Polish Prime Minister Prize for the outstanding scientific achievements. He was awarded a Banach Medal (by Polish Academy of Sciences) and several other prestigious awards. He was an Ordinary Member of Polish Academy of Sciences and a Corresponding Member of Arts and Sciences (PAU).

He was President of the Polish Mathematical Olympiad Committee in 1973-1990. He himself was a laureate of the First Polish Olympiad in 1949/50.

He has about 140 publications. In particular joint with Joram Lindenstrauss *"Absolutely summing operators in L_p -spaces and their applications"* (1968), monography jointly written with Czesław Bessaga *"Selected topics in infinite-dimensional topology"* (1975), more recent *"Canonical Sobolev projections of weak type (1,1)"* in memoir of American Mathematical Society in 2001 (joint with J. Bourgain, E. Bergson and M. Wojciechowski) and the last one *"Some approximation properties of Banach spaces and Banach lattices"* published in Israel Journal of Mathematics in 2011 (joint with Tadeusz Figiel and William Johnson).

Several outstanding mathematicians were his PhD students: T. Figiel, N. Nilson, T. Szankowski, S. Szarek, N. Tomczak-Joergemann, M. Wojciechowski, P. Wojtaszczyk, W. Wojtyński. However, he influenced many more, in Poland and abroad. He served with his wisdom and enthusiasm for more than half of century.



WHAT IS NEW IN WCMCS?

WCMCS abbreviates Warsaw Center of Mathematics and Computer Science. The Center is a consortium consisting of IMPAN and MIM UW (Faculty of Mathematics, Informatics and Mechanics of the University of Warsaw). This is 5 years prestigious programme within the action of Polish Ministry of Science and Higher Education called KNOW (Krajowy Naukowy Ośrodek Wiodący – State Scientific Leading Center), the only one in mathematical sciences, subsidised by the Ministry. It started to operate in Fall 2012. Web page: <http://www.wcmcs.edu.pl/>

The actions of WCNM include:

→ PhD fellowships. Already 12 awarded for the academic year 2012/13, the competition for 2013/14 has been opened.

- PhD internships. Already in 3 competitions, 12 awarded for 2013 and 2 for Spring semester 2014.
- Students' internships (concerning only MIMUW).
- Postdoc positions. In 3 competitions, about 15 1-year positions have been awarded and accepted for the years 2012–2014.
- Scientific events:
 - Conferences, workshops, schools organized within the framework of the Banach Center (financial support) – 12 in 2013.
 - Scientific meetings (conferences etc.) co-organized by research groups from WCMCS.
 - Small meetings, seminars, working groups organized at the institutions of WCMCS.



Warsaw Center
of Mathematics
and Computer Science

Banach Center Upcoming Events 2013

For more information, please check out: <http://www.impan.pl/BC/Program/2013.html>

	TITLE	DATE	ORGANIZERS	PLACE
1.	XXVII Conference on the History of Polish Mathematics	20–24.05.2013	W. Więstaw	Będlewo
2.	International Conference Beyond Uniform Hyperbolicity	27.05–07.06.2013	K. Barański, Ch. Bonatti, K. Burns, S. Crovisier, M. J. Pacifico, F. Przytycki, M. Viana, L. Wen, A. Wilkinson	Będlewo
3.	Advances in Mathematics of Finance. 6th General AMaMeF and Banach Center Conference	10–15.06.2013	A. Palczewski, Ł. Stettner	Warsaw
4.	Between Theory and Applications – Mathematics in action (conference)	16–22.06.2013	A. Bartłomiejczyk, G. Graff, J. Signerska, M. Styborski	Będlewo
5.	Chilean-French-Polish Conference on Nonlinear Evolutionary PDE's	30.06–05.07.2013	P. Biler, M. Kowalczyk, P. Rybka	Będlewo
6.	School of Gravitational Waves	30.06–06.07.2013	Ch. Belczynski, T. Bulik, P. Jaranowski, B. Krishnan, A. Królak, B. Owen, R. Prix, D. Rosińska, J. T. Whelan	Warsaw
7.	Satellite Summer School to the 7th International Conference on Lévy Processes	07–13.07.2013	K. Bogdan, Z. Palmowski	Będlewo
8.	C*-algebras and Banach Algebras (workshop)	08–12.07.2013	H. G. Dales, M. Daws, P. Koszmider, A. Skalski	Warsaw
9.	Arithmetic Geometry (conference)	14–20.07.2013	L. Berger, F. Déglise, A. Langer, W. Nizioł	Warsaw
10.	Classical Aspects of Ring Theory and Module Theory (conference)	14–20.07.2013	C. Bagiński, P. Grzeszczuk, J. Matczuk, R. Mazurek, J. Okniński	Będlewo
11.	7th Conference on Lévy Processes	15–19.07.2013	K. Bogdan, T. Byczkowski, Z. Palmowski, T. Rolski, Ł. Stettner	Wrocław
12.	Applied Topology (conference)	21–27.07.2013	W. Marzantowicz, P. Dłotko, G. Graff	Będlewo
13.	Topology and Nonlinear Problems (conference)	11–17.08.2013	A. Granas, M. Starostka, Z. Kucharski, H. Żołądek	Warsaw
14.	Geometric Singularity Theory. Polish-Japanese Singularity Theory Working Days	24–31.08.2013	W. Domitrz, G. Ishikawa, S. Izumiya	Warsaw
15.	Formal and Analytic Solutions of Differential, Difference and Discrete Equations (conference)	25–31.08.2013	W. Balsler, G. Filipuk, G. Łysik, S. Malek, S. Michalik, M. Yoshino	Będlewo
16.	Global Study of Differential Equations in the Complex Domain (workshop)	01–07.09.2013	G. Filipuk, G. Łysik, S. Michalik, M. Yoshino	Warsaw
17.	Mathematics, Mechanics and Modelling. A tribute to Zbigniew Peradzyński (conference)	22–27.09.2013	B. Kaźmierczak, T. Lipniacki, P. Mucha, T. Piasecki, P. Rybka, D. Wrzosek	Będlewo
18.	Semigroups of Operators. Theory and Applications (conference)	06–11.10.2013	J. Banasiak, A. Bobrowski, M. Lachowicz, Z. Łagodowski, M. Murat	Będlewo

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