



The Institute of Mathematics of the Polish Academy of Sciences

70 years of IMPAN

an overview

Early days

- 20th November 1948 – the act signed by the Prime Minister and the Minister for Education, creating the
State Mathematical Institute
- 1952 – Polish Academy of Sciences created. The institute incorporated into the Academy and renamed
Institute of Mathematics of the Polish Academy of Sciences
i.e.
IMPAN (Instytut Matematyczny Polskiej Akademii Nauk)

Back in time – Janiszewski in 1918

1918 – Poland regained independence

Zygmunt Janiszewski, a topologist from Warsaw: famous article

On the needs of mathematics in Poland



Janiszewski's proposals

- providing income to the most talented individuals so that they can focus solely on their scientific training and research
- creating a 'laboratory of mathematical research'
- establishing a publication house, which would publish both (specialized!) mathematical journals and mathematical monographs
- establishing and maintaining a central mathematical library
- promoting collaborative activities and collegiate atmosphere among mathematicians

Pre-1948 developments

- 1919 – creation of the Polish Mathematical Society
- 1920 – *Fundamenta Mathematicae*, first specialized mathematical journal in the world
- 1936 – a memorandum of Kazimierz Kuratowski, 'On the state and needs of mathematics in Poland': idea of creating two mathematical institutes, theoretical in Warsaw, applied in Lwów
- 1945 – Kuratowski, Karol Borsuk and Bronisław Knaster outline a project for the institute



First days

Theoretical Section

Foundations of Mathematics

Topology

Functional Analysis

Theory of Real Functions

Differential Equations

Analytic Functions

Differential Geometry

Mathematical Physics

Applied Section

General Applications

Technical Group

Actuarial Group

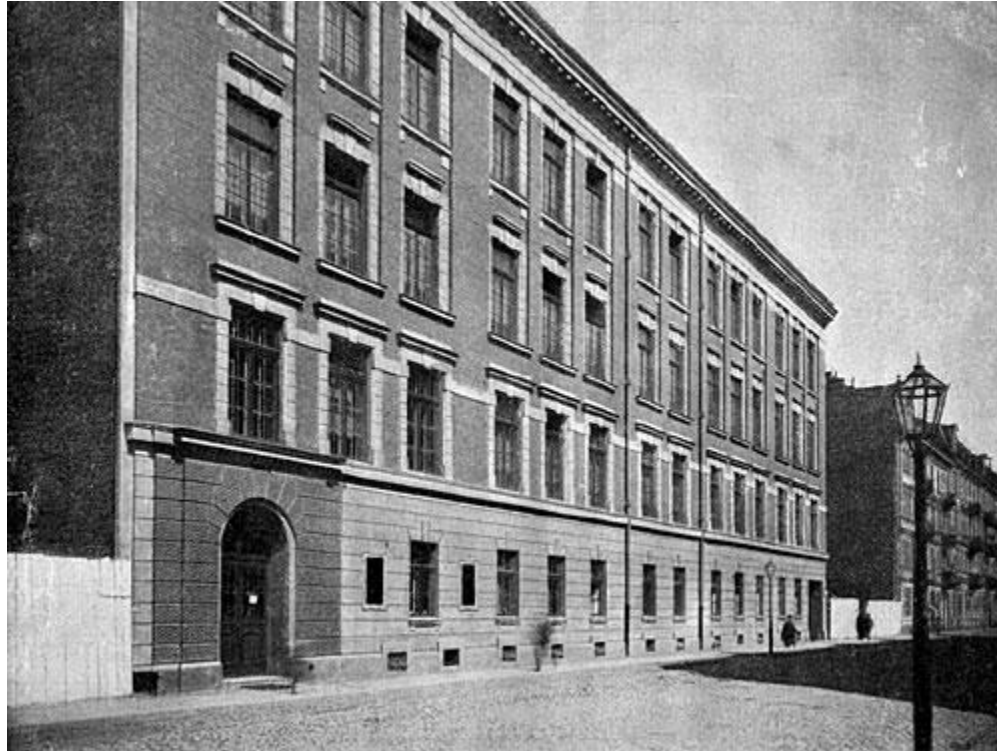
Mathematical Apparata

Graphical Methods

Statistical Control of the Production Quality.

Warsaw headquarters

building at Śniadeckich 8, constructed in 1902 as 'Rontaler school'



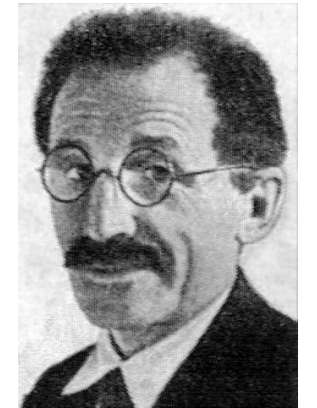
Pre-1939: Rey Gymnasium, Warsaw Scientific Society...

Warsaw Scientific Society at Śniadeckich

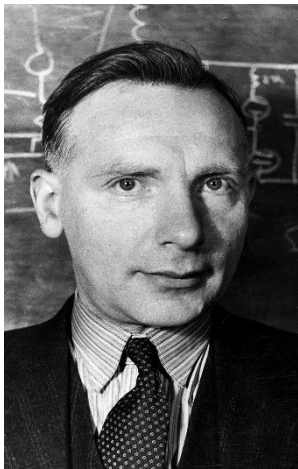
Edward Flattau - neurologist



Ludwik Wertenstein – radiologist



Józef Rotblat – 1995 Peace Nobel Prize Winner



Śniadeckich now



Central Mathematical Library

created in 1947, at Śniadeckich since 1952

88 000 books, 90 000 journal volumes, electronic resources



since 1998 part of the **National Library Resources**

leading a national programme

(Open Resources in) Digital Repositories of Research Institutes

Journals edited and published by IMPAN

[Acta Arithmetica](#) (1935)

[Annales Polonici Mathematici](#) (1955)

[Applicationes Mathematicae](#) (1953)

[Banach Center Publications](#) (1976)

[Bulletin Polish Acad. Sci. Math.](#) (1979)

[Colloquium Mathematicum](#) (1947)

[Dissertationes Mathematicae](#) (1952)

[Fundamenta Mathematicae](#) (1920)

[Studia Mathematica](#) (1929)

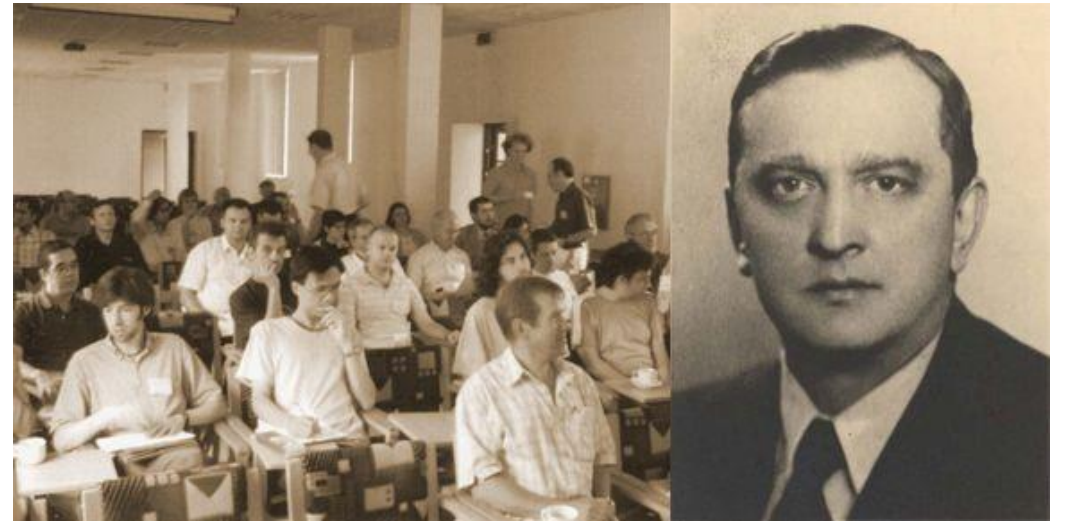


monograph series

Monografie Matematyczne
IMPAN Lecture Notes
Księgozbiór Matematyczny

Banach Center

conference arm of the institute



- created in **1972**, by Academies of Sciences of Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Romania and USSR
- **1998** – agreement with the European Mathematical Society
- headed by the director of IMPAN or one of the deputy directors
- supervised by the **International Council of the Banach Center**

Banach Center - locations

until 1990s: **Mokotowska street, Warsaw (pałacyk Cukrowników)**



Banach Center - locations

since 1996: **Będlewo**



together with Warsaw over 50 meetings (conferences, workshops, research groups) and 2500 visitors a year

Structure and leaders of the institute

- director selected by the President of the Polish Academy of Sciences (4 years term)
- choosing in turn deputy directors for scientific and administrative matters
- strong advisory role played by the Scientific Council

Leaders of the institute - history

Directors

Kazimierz Kuratowski (1948-1967)

Roman Sikorski (1968-1969)

Jerzy Maria Łoś (1970)

Czesław Olech (1970-1985)

Bogdan Bojarski (1985-2002)

Stanisław Janeczko (2002–2010)

Feliks Przytycki (2010-2018)

Łukasz Stettner (2018-)

Chairmen of the Scientific Council

Wacław Sierpiński (1949-1968)

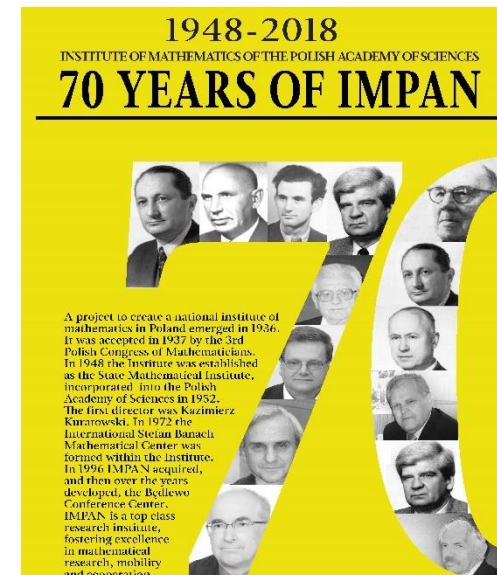
Kazimierz Kuratowski (1968-1980)

Karol Borsuk (1980-1982)

Zbigniew Ciesielski (1980-1989)

Czesław Olech (1990-2007)

Andrzej Schinzel (2007-)



Chairmen of the Banach Center Council

- Lubomir Iliev (Bulgaria) 1972-1976
- Ákos Császár (Hungary) 1977-1980
- Klaus Matthes (East Germany) 1981-1982
- Kazimierz Urbanik (Poland) 1983-1986
- Romulus Cristescu (Romania) 1987-1989
- Sergej M. Nikol'skiĭ (USRR) 1990-1992
- Friedrich Hirzebruch (Germany) 1993-2001
- Rolf Jeltsch (Switzerland) - 2002-2005
- Ari Laptev (Sweden) - 2006-2013
- Marta Sanz-Sole (Spain) – 2013 – 2014
- Pavel Exner (Czech Republic) – 2014 -



ICM in Warsaw, IMPAN at ICM

- 1983 ICM in Warsaw, Czesław Olech head of the organising committee
- (some of the) ICM speakers related to IMPAN:

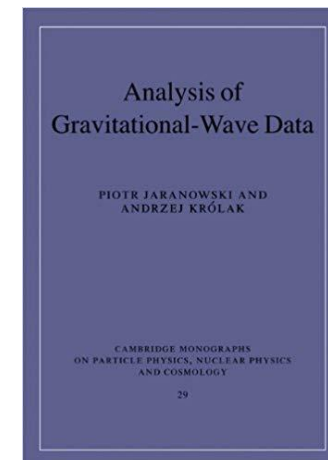
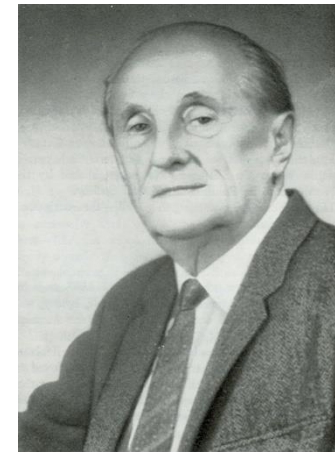
Karol Borsuk, Jerzy Łoś, Aleksander Pełczyński, Czesław Olech, Andrzej Schinzel, Henryk Iwaniec, Tadeusz Iwaniec Tadeusz Figiel, Zbigniew Ciesielski, Henryk Toruńczyk, Stanisław Lech Woronowicz and Jerzy Zabczyk

- Last ICM at Rio de Janeiro: Feliks Przytycki, Wojciech Kucharz



Applied side

- existed since the beginning – with **Hugo Steinhaus** as an important leader
- first Polish computer, **XYZ**, built at IMPAN 1957/1958
- 2003: a **Center for Applications of Mathematics (Mathematical Center for Science and Technology)** established by Stanisław Janeczko
- annual (since 1972) **National Conferences on Applications of Mathematics**
- **Applicationes Mathematicae** since 1953
- recently: Andrzej Królak leading **VIRGO-POLGRAW**, the Polish team working on detection of gravitational waves



Structure of research teams

- Department of Algebra and Algebraic Geometry
- Department of Differential Equations
- Department of Foundations of Mathematics
- Department of Functional Analysis
- Department of Biomathematics
- Department of Mathematical Physics and Differential Geometry
- Department of Mathematical Statistics
- Department of Number Theory
- Department of Probability Theory and Mathematics of Finance
- Department of Topology
- Department of Dynamical Systems
- Laboratory of Numerical Analysis
- Laboratory of Noncommutative Geometry

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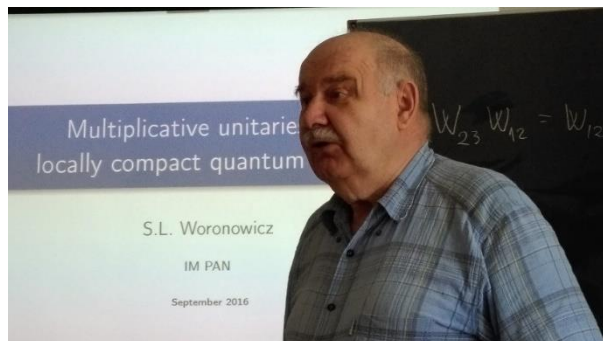
Staff, branches...

- branches in Wrocław and Kraków (the biggest), then in Gdańsk and Toruń, smaller groups in Katowice and Poznań
- approximately 30 permanent researchers, 25 long-term researchers and around 50 mathematicians employed on short-term (1-2 years) contracts
- researchers from Poland, Brazil, China, France, Iran, Israel, Japan, Russia, Ukraine, United Kingdom, United States...
- support staff (secretaries, librarians, IT team, finances, Będlewo staff...)
- Graduate School (20 PhD students)
- well over 30 regular seminars

International activities, IMPAN Prizes

- membership in ERCOM
- **two first individual ERC grants in mathematics in Poland**: Piotr Nowak (2016) and Piotr Achinger (2018)
- **Simons Semesters in Banach Center** (since 2015)
- prizes awarded in the Institute: **Kuratowski Prize** (since 1981), **Prize of the Director of IMPAN** (since 2010), **Zémanek Prize** (since 2018)

Living tradition ready for new challenges



Some research achievements

- Andrzej Schinzel and Waław Sierpiński, Sur certaines hypothèses concernant les nombres premiers. *Acta Arith.* **4** (1958)
- Kazimierz Kuratowski and Czesław Ryll-Nardzewski, A general theorem on selectors. *Bull. Acad. Polon. Sci. Sér. Sci. Math. Astronom. Phys.* **13** (1965)
- Karol Borsuk, Theory of retracts. Monografie Matematyczne, Tom 44 Państwowe Wydawnictwo Naukowe, Warsaw, 1967
- Joram Lindenstrauss and Aleksander Pełczyński, Absolutely summing operators in L^p -spaces and their applications. *Studia Math.* **29** (1968)
- Tadeusz Figiel, Joram Lindenstrauss and Vitaliy Milman, The dimension of almost spherical sections of convex bodies. *Acta Math.* **139** (1977)
- Henryk Toruńczyk, Characterizing Hilbert space topology. *Fund. Math.* **111** (1981)
- Bogdan Bojarski and Tadeusz Iwaniec, Analytical foundations of the theory of quasiconformal mappings in R^n . *Ann. Acad. Sci. Fenn. Sér. A I Math.* **8** (1983)
- Stanisław Lech Woronowicz, Compact matrix pseudogroups. *Comm. Math. Phys.* **111** (1987)
- Feliks Przytycki, Mariusz Urbański and Anna Zdunik, Harmonic, Gibbs and Hausdorff measures on repellers for holomorphic maps. I. *Ann. of Math. (2)* **130** (1989)
- Giuseppe Da Prato and Jerzy Zabczyk, Stochastic equations in infinite dimensions. Encyclopedia of Mathematics and its Applications, 44. Cambridge University Press, Cambridge, 1992
- Zbigniew Jelonek, On the effective Nullstellensatz. *Invent. Math.* **162** (2005)
- Valentin Féray and Piotr Śniady, Asymptotics of characters of symmetric groups related to Stanley character formula. *Ann. of Math. (2)* **173** (2011)