



Image Processing Systems Institute of the RAS: 25 years in existence



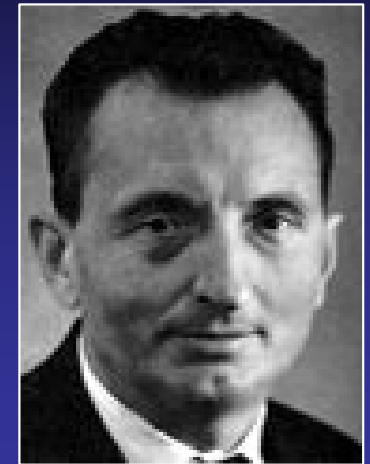
151 Molodogvardeiskaya, Samara

BACKGROUND

- In the late 70s of the past century, a research team of Kuibyshev Aviation Institute headed by Professor V. A. Soifer involved in active collaboration with partners from the Institute of Information Transmission Problems of the USSR Academy of Sciences and Department A of the P. Lebedev Physical Institute of the USSR Academy of Sciences. In the early 80s, fundamental works in the field of image processing and diffractive optics were published:
- Vittikh V.A., Sergeev V.V., Soifer V.A. Image processing in automated systems for scientific research, Moscow, Nauka Publishers, 1982, 215 p.
- Golub M.A., Karpeev S.V., Prokhorov A.M., Sisakyan I.N., Soifer V.A. Focusing of coherent light onto a desired spatial domain using computer-generated holograms // Soviet Technical Physics Letters, 1981, Vol. 7, No. 10, pp. 618-623.
- Golub M.A., Prokhorov A.M., Sisakian I.N., Soifer V.A. Synthesis of spatial filters for investigation of transversal modal content of coherent radiation // Quantum Electronics, 1982, Vol. 9, No. 9, pp. 1866-1868.
- Solution of the inverse problem of focusing of a laser beam in an arbitrary curve // Doklady Physics, 1983. Vol. 273. № 3. P. 605-607.
- Bessel-Optics // Doklady Physics, 1984. Vol. 274. № 4. P. 802-804.

COMPUTER OPTICS

- Thus, in the 80s of the past century, a new research field of **Computer Optics** emerged at the interface of quantum electronics, information technologies, and microelectronics.
- In 1987, academicians A.M.Prokhorov and Ye.P.Velikhov, professors I.N.Sisakian and V.A.Soifer initiated the publication of an international scientific periodical of **Computer Optics**.
- In 1988, the research group led by V.A.Soifer formed the core of the newly established Kuibyshev Branch of the Central Design Bureau of Unique Instrumentation of the USSR Academy of Sciences with a staff of 60 employees, with **Computer Optics** approved as research direction.



A.M. Prokhorov
(1916 - 2002)



I.N. Sisakian
(1938 - 1995)

CDB UI Branch (1988-1993)

- The core of the KB of CDU IU of the USSR AS's research team was formed by young Candidates of Science Ye.Yu. Arefiev, M. A. Golub, N. L. Kazanskiy, V. V. Kotlyar, O. V. Prisekina, A. G. Khramov; with V. A. Soifer appointed the CDB UI's director. Credit for large efforts associated with the CDB UI Branch establishment goes to Yu. N. Boyarkin, L. F. Egorova, Yu. A. Runkov, L. P. Chepurnova, and G. G. Yamovich.
- State companies "High Technologies" (1991-1998), "Conversion of Samara" (1991-1994).
- Articles with high citation index are published:
 - Infra-red radiation focusators // Optics and Lasers in Engineering. -1991;
 - Focusators for Laser-Branding // Optics and Lasers in Engineering. -1991;
 - The phase rotor filter // J. Modern Optics. -1992;
 - Trochoson // Optics Communications. -1992;
 - Computer generated diffractive multi-focal lens // Journal of Modern Optics. -1992.
- **External scientific links developed, e.g. with academician Zhuravlev's team; first international contracts concluded (FIAT Research Center).**
- Advanced Doctor's degrees awarded (M. A. Golub, 1990, V. V. Kotlyar, 1992).
- State Prize of the RF in Science and Engineering (I. N. Sisakian, V. A. Soifer, V. P. Shorin et al., 1992).



Samara, 1992

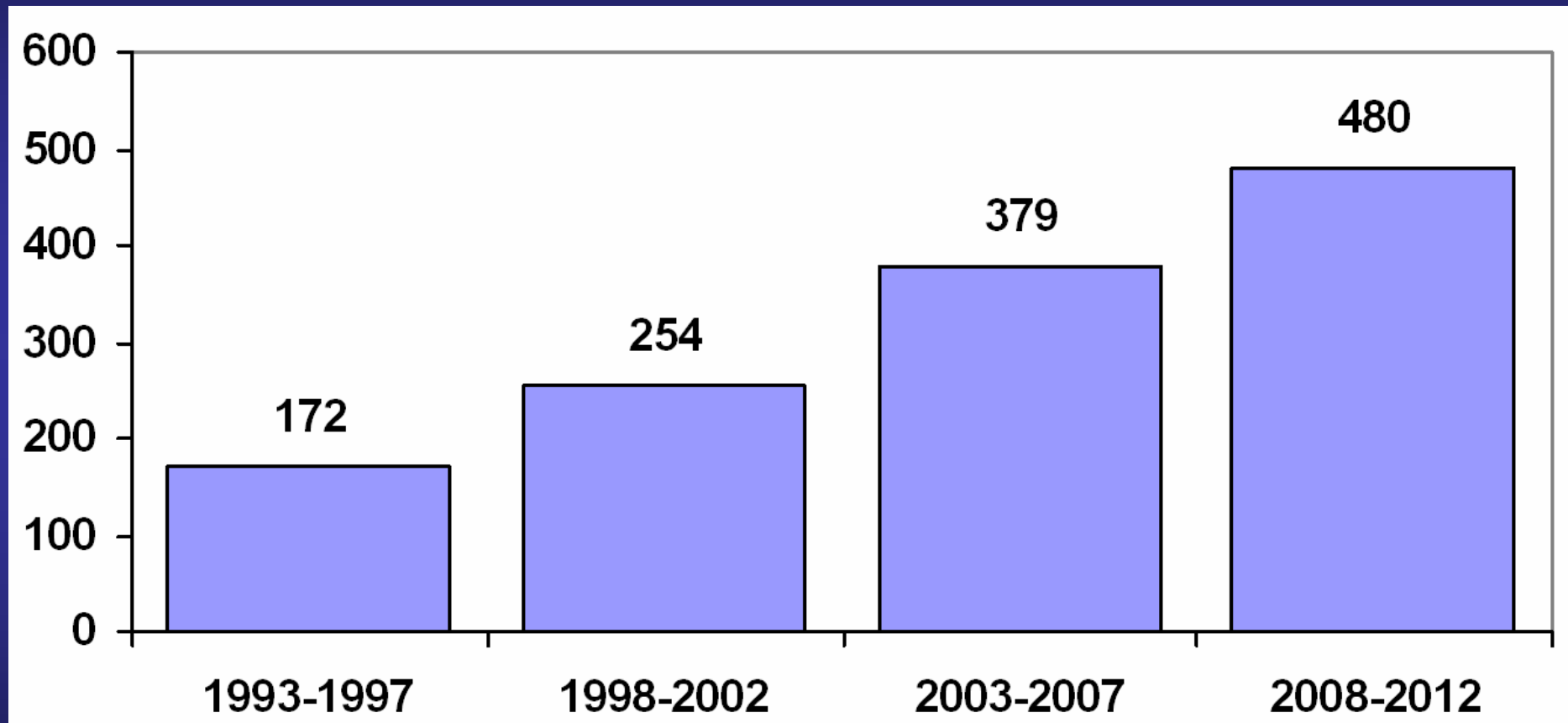
Establishment of IPSI RAS

- 1993: Image Processing Systems Institute of the RAS stems from the SB CDB UI RAS with support from academicians S. V. Emelyanov, Yu. I. Zhuravlev, and V. P. Shorin.
- 1998: IPSI RAS awarded a “basis” budget funding from the RAS for a staff of 50 people.
- Currently (autumn 2013), IPSI RAS has 44 budget-funded positions, with the total number of employees, including part-timers, reaching 100 people.

Integration of research and education

- 1988: by a joint order of the Ministry of Education and the USSR Academy of Sciences a Research & Education Center "Spectrum" is established jointly with Kuibyshev Aviation Institute (currently, SSAU).
- 1997- 2004: active participation of the "IPSI RAS + SSAU" tandem in a federal program "Integration". IPSI & SSAU jointly establish centers for collective use of equipment and base chairs.
- 2002-2012: establishment and development of a Research & Education Center of Mathematical Principles of Diffractive Optics and Image Processing as part of the Russian-American program "Basic Research and Higher Education".
- 2006-2007: participation in the SSAU's innovative educational program.
- Since 2009, IPSI RAS has participated in the program of SSAU's development as a National Research University.
- Participation in the RAS' Presidium program "Support for Young Researchers".

IPSI RAS publications dynamics



Books

Title
Laser Beam Mode Selection by Computer Generated Holograms // <i>CRC Press, Boca Raton, 1994, 215 p.</i>
Iterative Methods for Diffractive Optical Elements Computation // <i>Taylor&Fransic, London, 1997, 250 p.</i>
Methods for Computer Design of Diffractive Optical Elements // <i>Wiley-Interscience, New York, 2002, 765 p.</i>
Computer Image Processing, Part I: Basic concepts and theory // <i>VDM Verlag, 2009, 296 p.</i>
Computer Image Processing, Part II: Methods and algorithms // <i>VDM Verlag, 2009, 584 p.</i>
Computer Design of Diffractive Optics // <i>Woodhead Publishing, Cambridge, UK, 2012, 883 p.</i>



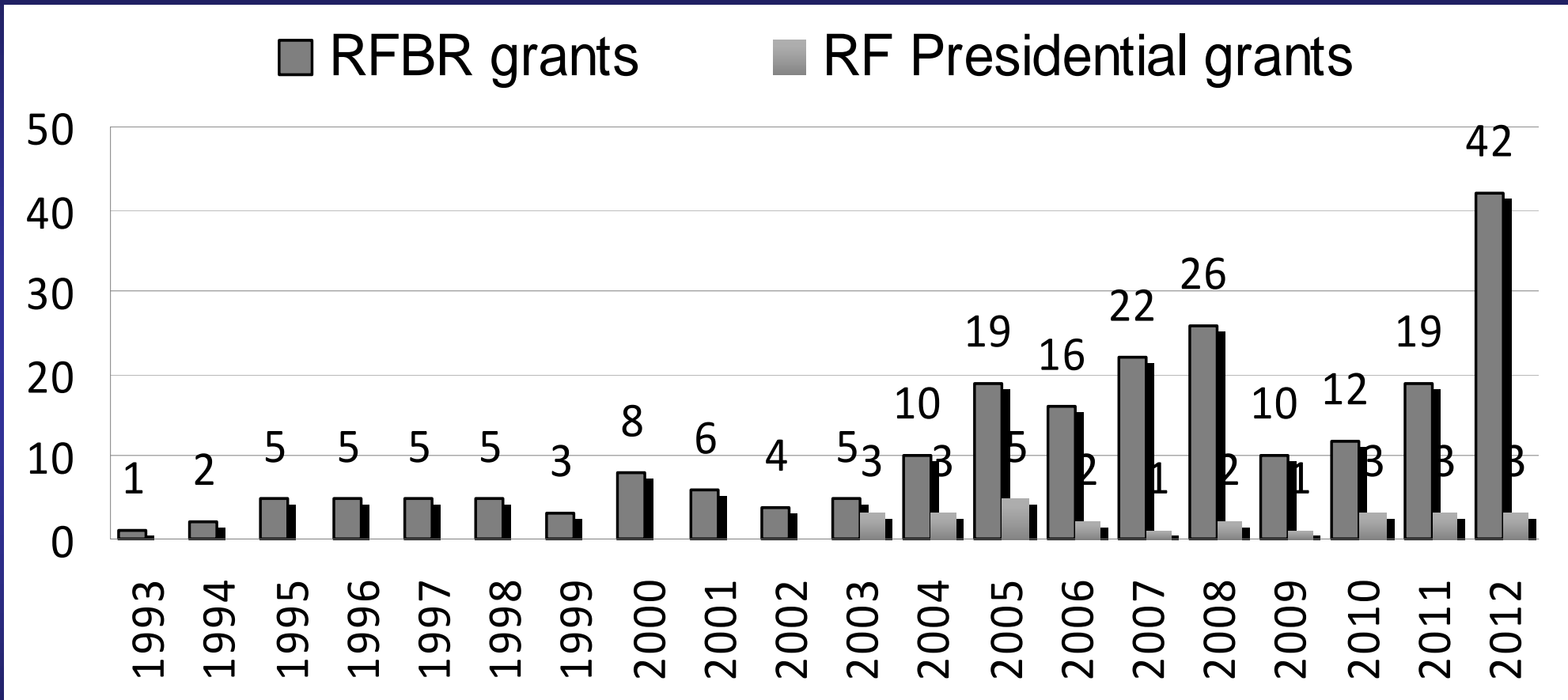
2007



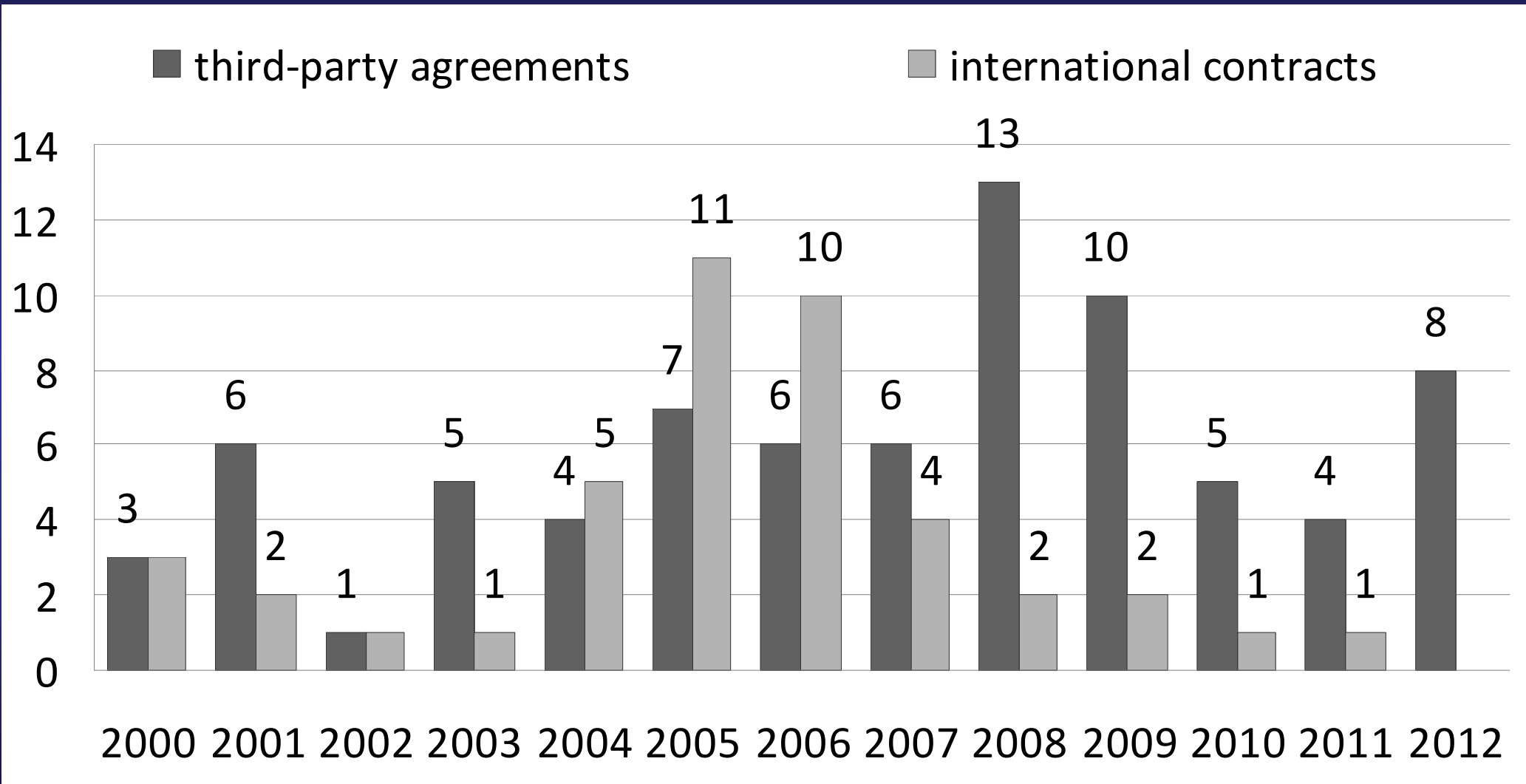
2007

2011

RFBR grants and RF Presidential grants



Commercial agreements and contracts



Major awards (1994-2013)

- 1995: Order of Honor (V. A. Soifer).
- 1999: Title of "Honored worker of science" (V. A. Soifer).
- 1999: Medal of order "For Services to Motherland", II degree (N.L.Kazanskiy).
- 2004: RF State Prize for Young Researchers (V. S. Pavelyev, D.L.Golovashkin).
- 2006: Order "For Services to Motherland", IV degree (V. A. Soifer).
- 2007: RF Government Prize in Science and Engineering (V.A. Soifer).
- 2010: Order "For Services to Motherland", III degree (V.A. Soifer).
- 2010: RF Government Prize in Education (V. A. Soifer).
- 2011: RAS medal for Young Researchers (V. A. Kolpakov).
- 2012: Gold medal of the International Invention Show in Geneva (A.G.Khramov).
- Two laureates of Samara Governor's Prize for Outstanding Achievements in Science and Engineering: V. A. Soifer, 2007; V.V.Kotlyar, 2012.
- 16 laureates of Regional Prize in Science and Engineering: N. L. Kazanskiy, V. V. Kotlyar, V. V. Sergeev, 1998; V. M. Chernov, 1999; V.A. Soifer, V.A.Fursov, V. V. Kravchuk, 2001; N. I. Glumov, N.Yu.Ilyasova, A.G.Khramov, 2003; A. V. Volkov, 2007; S. V. Karpeev, 2008; L.L.Doskolovich, 2009; S. N. Khonina, 2010; R. V. Skidanov, 2011; V.V.Myasnikov, 2012.

IPSI RAS' research areas

As defined by the #37 Resolution of the RAS Presidium of 12 February 2008, key areas of the Institute's research activities include:

- Computer Optics
- Nanophotonics
- Optical Information Technologies and Systems
- Systems for Image Analysis and Pattern Recognition
- Geo-information Technologies



IPSI RAS' Laboratories

Diffraction Optics Laboratory



Head:
N. L. Kazanskiy
Doctor of
Phys. & Math,
Professor

Laser Measurements Laboratory



Head:
V. V. Kotlyar
Doctor of
Phys. & Math,
Professor

Laboratory of Micro- & Nanotechnologies



Head:
A. V. Volkov,
Doctor of
Engineering,
Professor

Laboratory of Mathematical Methods of Image Processing



Head:
V. V. Sergeev,
Doctor of
Engineering,
Professor

IPSI RAS research staff

	Full-time Doctors of Science	Full-time Candidates of Science	Young researchers under 35
Employees	15	17	60
Staff average age	50	35	-
Proportion of salary in the general wage-fund in 2012	-	-	48%

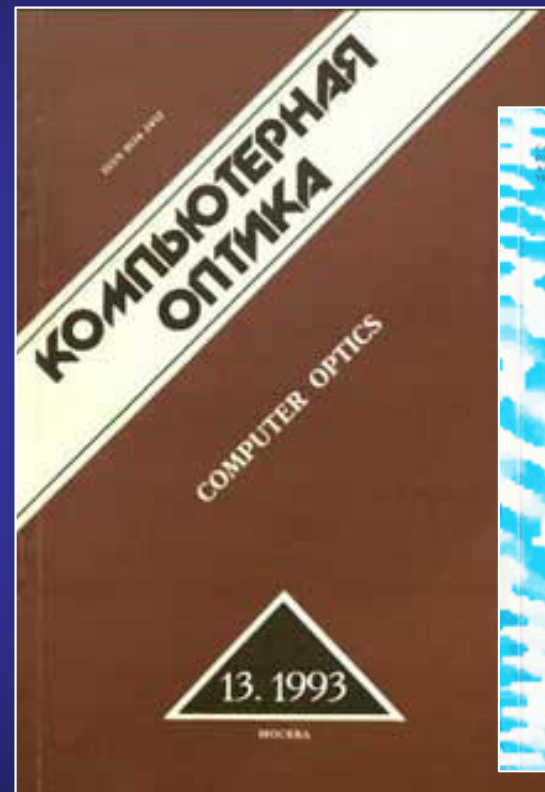
Number of IPSI RAS' results included in the list of annual research achievements of the Russian Academy of Sciences (RAS Reports)

2005	2006	2007	2008	2009	2010	2011	2012
1	1	1	4	7	5	9	3

Russian Citation index of IPSI RAS' researchers

	Name	Publications	References	Hirsh index
1	V. A. Soifer	409	2747	20
2	V. V. Kotlyar	337	1610	17
3	S. N. Khonina	285	1387	16
4	N. L. Kazanskiy	309	1308	14
5	L. L. Doskolovich	209	961	12
6	R. V. Skidanov	100	393	8
7	V. S. Pavelyev	125	345	8
8	A. V. Volkov	83	340	7
9	S. I. Kharitonov	98	327	9
10	V. V. Sergeev	97	281	4
11	S. G. Volotovskiy	39	221	9
12	N. I. Glumov	62	211	4

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Computer Optics is abstracted and indexed in **Scopus & Compendex**

<http://www.computeroptics.smr.ru/>



Thank you for your attention!