George Jaiani – 75

Head of the Chair of Mechanics of the Faculty of Exact and Natural Sciences of Ivane Javakhishvili Tbilisi State University (TSU), Director of the Ilia Vekua Institute of Applied Mathematics of TSU Prof. George Jaiani turned 75 years old.

George V. Jaiani was born on June 19, 1945, in Tbilisi (Georgia). Jaiani's activity is fully connected with TSU, where he became a student of the Faculty of Mechanics and Mathematics in 1962 after graduating with a gold medal from the 55th secondary school in Tbilisi (Georgia).

He Graduated from the I. Javakhishvili Tbilisi State University for Mathematics and Mechanics with the diploma of Honour in Mechanics (January, 1968). While still a student, he attracted the attention of Ilia Vekua, an academician of sciences who had just returned to Georgia from Russia and had already received international recognition. He defended his Ph.D. thesis "Some Problems for Prismatic Shells with Cusped Edge" in 1974, his advisor was academician, Professor Ilia Vekua. From October 1979 till July 1980 he was visiting research fellow (borsista) at the University of Rome "La Sapienza" under supervision of Professor G. Fichera. In 1986 he defined his Dr. Hab. (Doctor of Sci.) thesis: "Boundary Value Problems for Linear Elliptic Equations with Order Degeneration and Their Applications" in Differential Equations and Mathematical Physics (referees were Professor V.A. Kondratiev, Professor A.I. Janushauskas, Professor E.I. Obolashvili). In 1968 he started work at Institute of Applied Mathematics of Tbilisi State University (TSU) as Junior researcher. Then he went through each level of service to the position of director of the institute. From 1974 until 1987 he was Scientific Secretary of the institute, from 1987 until December 2006 Deputy Director and from 2006 up to now he is the Director of I.Vekua Institute of Applied Mathematic (VIAM) of TSU. At the same time from 1971 until 1994 he was at first lecturer and then invited professor of TSU. From 1994 he is a Professor of TSU.

Prof. G. Jaiani's scientific interests are partial differential equations; mathematical modelling; solid mechanics; solid-fluid interaction problems; shell and plate theory. In particular, boundary value problems for singular elliptic and hyperbolic equations and systems and their applications to the theory of cusped plates and shells. The problem of dependence of the well-posedness of the Dirichlet and Keldysh type boundary value problems on the coefficients of the canonical form equation with type and order degeneration has been studied. For elliptic Euler-Poisson-Darboux equation in the case of the half-plane, the boundary value problem has been solved in an explicit form (in the form of Poisson's type integral formulas) when on the boundary the normal derivative of the arbitrary fixed order with pertinent weight (in particular, Dirichlet, Neumann and weighted boundary value problems, in general, which as particular case contains Poisson's integral

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formula) is given. The Holmgren generalized weighted problem for the half-circle has been solved as well. For the half-plane weighted, in general, boundary value problems for equations of even (higher) order, whose corresponding operator may be given as a product of elliptic Euler-Poisson-Darboux operators with different, in general, coefficients, are solved in the form of Poisson's type integral formulas. In the case of a finite domain the existence and uniqueness theorems are proved for the boundary value problems with weighted conditions, posed for the second order elliptic equations of two independent variables, when the order of the equation degenerates. The behaviour of these solutions is studied in neighbourhoods of points of discontinuity of boundary data. It is noteworthy that in works of G. Jaiani the I. Vekua problem (set in 1955) of investigation of nonclassical boundary value problems for prismatic shells with cusped edges, i.e., when the thickness of the shell vanishes at that edges, has been solved. He established criteria, when may be posed Dirichlet problem and when should be posed Keldysh problem, in the integral form, in general case of vanishing of the thickness, which for the case of the thickness vanishing as power function look like $\kappa < \frac{1}{2N+1}$ and $\kappa \geq \frac{1}{2N+1}$, respectively, where κ is the exponent of the power function and N is the order of the approximation of I. Vekua's hierarchical models. In, particular, the problem, when the prismatic shell projection (plan) is a half-plane and at the boundary concentrated forces and moments are applied, George Jaiani solved in the explicit form. These solutions contain as particular cases the well-known solutions of the classical Flamant, Cerruti, and Carothers' problems; the study of the properties of singular differential equations gave a complete look at the well-posedness of boundary conditions, depending on the kind of sharpening of cusped edges of the prismatic shells and of cusped ends of beams; G. Jaiani constructed and investigated hierarchical models of beams. In this direction he published more than 120 scientific papers and 6 monographs. In addition he is an author of 5 Textbooks and editor of 7 books.

A brief survey of results concerning cusped prismatic shells, in particular, cusped plates and cusped bars (beams) obtained by G. Jaiani until 2011 is given in his monograph "Cusped Shell-like Structures, SpringerBriefs in Applied Sciences and Technology, Springer-Heidelberg-Dordrecht-London-New York, 2011, 84p.".

Professor George Jaiani supervised the theses of 6 Ph.D students.

He has had visiting positions, research stays and participation in Congresses, conferences and symposia in Germany, Italy, France, Greece, Switzerland, Hungary, Spain, Poland, Austria, Czech Republic, Russia, Estonia, Armenia, Uzbekistan, Kazakhstan, Turkey, Netherlands, Australia and USA, in particular, he participated in ICM-94, ICM-98, ICM-2018, ECM1, ECM2, ICIAM 95, ISAAC 97, 3ECM, ICTAM2000, ICIAM07, 5ECM, ICTAM2008, ICCS 17, AIDAA XXII, ACEX2014, ACEX2015, ICTAM2016, ACEX2017, ACEX-2019. He was several times invited as Visiting Professor by universities in Germany, Italy, and USA.

In 1978, George Jaiani was awarded the medal and prize of the Georgian Academy of Sciences for young researchers, in 1998 the medal and in 2013 the order of merit of the Georgian president for achievements in scientific and educational activities. During the last 25 years he received several grants, among them a grant of the International Science Foundation (George Soros Foundation) in 1993, a scholarship of the German Academic Exchange Service (DAAD) in 1994 and 1999, a grant of NATO-CNR (Consiglio Nazionale delle Ricerche, Italy) for the project "Solid-fluid mathematical models describing the stress state of a dam together with its environment under non ordinary actions" in 1995/6, a grant of the Max-

Planck-Gesellschaft for the project "Application of singular integral operators to problems of mathematical physics" (1996), a grant of Ateneo (University of Rome "La Sapienza", 1996), a grant of the DFG (German Science Foundation) for the project "Investigation of cusped bars, plates, and connected with them degenerate ordinary, elliptic and hyperbolic differential equations" (1999), etc. During the last years he obtained several grants from the Ministry of Education and Sciences of Georgia and the Shota Rustaveli National Science Foundation.

Attention is to drawn to the aspect of Jaiani's scientific-organization activities. As it was mentioned at various times he held the positions of scientific secretary of the Institute of Applied Mathematics named after Vekua TSU (1974–1987), Deputy Director of the Institute for Research (1987–2006), and from 2006 to the present time is the Director of the Institute. While still very young, he was first a member, then deputy chairman and the chairman of the scientific and/or organizing committees of a number of international scientific forums, such as IUTAM Symposia (1978, 2007), ISAAC Conference (2007), International Annual Meetings of the Georgian Mechanical Union (2010-2020), First International Congress of Georgian Mathematicians (1994), International Conferences "Application of Mathematics and Informatics in Natural Sciences and Engineering (AMINSE)" (2015, 2016, 2017, 2019), International Enlarged Sessions of the Seminar of Ilia Vekua Institute of Applied Mathematics (1984–1986, 1988–2006, 2008-2020), International Conferences "Modern Problems in Applied Mathematics" [dedicated to the 90^{th} (95^{th}) Anniversaries (centenary), of TSU & 40^{th} (45^{th}, 50^{th}) Anniversaries of VIAM, 2008 (2013, 2018)], which allowed him to establish direct scientific ties with researchers from abroad.

Under the leadership of Jaiani and with the support of the President of the European Society of Mathematicians Professor F. Hirzebruch, Tbilisi International Center for Mathematics and Informatics (TICMI) was founded in 1995 at the Institute of Applied Mathematics under the auspices of the International Scientific Committee. The stucturee of the committee changes every three years, and three of the seven members are appointed by the Executive Committee of the European Society of Mathematicians. TICMI annually holds international conferences, symposia and refresher courses for different level of students. To which he invites Georgian and foreign scientists as lecturers.

In 2005-2008 at the University, and in the whole country (Georgia) the reforms, connected, in particular, with the research institutes, had their positive and negative sides. In this period Institute of Applied Mathematics was on the verge of closing, which was signed by an order to liquidate it at the end of 2006. During this difficult period Prof. G. Jaiani with the relying on the enthusiasm of the institute's research team managed to hold several international scientific forums under the auspices and support of international organizations (among them IUTAM Symposium *On Relation of Shell, Plate, Beam, and 3D Models* (dedicated to the Centenary of Ilia Vekua, April 23-27, 2007, Tbilisi) and ISAAC Conference on Complex Analysis, Partial Differential Equations, and Mechanics of Continua) and laid the foundation for the renovation of the institute. As a result of Jaiani's selfless work, in 2007 the institute received the status of a research institute of the Faculty of Exact and Natural Sciences, and in 2009 the institute was separated from the faculty and on September, 2016, by the decision of the University representative council, the status of the Institute as the independent scientific-research was restored. With these statutes the Institute team celebrated the 45^{th} and 50^{th} anniversaries of the

institute in 2013 and 2018, under the leadership of G. Jaiani. On the other hand, on his initiative in 2012, the chair of Mechanics founded by N.I. Muskhelishvili (in early 20-ies of last century) was restored.

Finally, it should be mentioned that George Jaiani is/was

- a member of the European Academy of Sciences (EurAsc, since 2002);
- a member of the Council of the Division of Mathematics of EurAsc (2009-2017);
- a fellow of the World Innovation Foundation (since 2002);
- a member of the Georgian Engineering Academy (since 2005);
- a member of the Georgian Academy of Natural Sciences (GANS, since 2000);
- a member of AMS (since 1998), ISAAC (since 2001), GAMM (since 2007), and ISIMM (since 1998);
- a member of the delegation of the Georgian Mathematical Union (GMU) at the inaugural meeting of the European Mathematical Society (EMS) (1990);
- Co-Chairman of the Georgian Mathematical National Committee (1989-1994)
- EMS Council member (delegate of individual members) (1994-2001);
- member of the EMS committee for support of East European mathematicians (2002-2009);
- in 1995 has founded, by support of EMS, GANS, and VIAM of TSU, the Tbilisi International Centre of Mathematics and Informatics (TICMI) (about activities of TICMI see BULLETIN of TICMI or Website http://www.viam.science.tsu.ge/others/ticmi);
- since foundation of TICMI Chairman of the International Scientific Committee of TICMI. TICMI contributes to the efforts of EMS to encourage quality research and teaching in mathematics in Transcaucasia and adjacent region;
- initiator together with Prof. P.E.Ricci of an agreement regulating direct cultural and scientific cooperation between Rome University "La Sapienza" and University of Tbilisi (since 1997);
- since foundation (2000) Co-Chairman, then Chairman (since 2012) of the Georgian National Committee of Theoretical and Applied Mechanics;
- President of the Georgian Mechanical Union (2012-2018);
- initiator of acceptance of Georgia as a member of IUTAM at Chicago meeting of the IUTAM General Assembly (2000);
- a member of the General Assembly of IUTAM (since 2001);
- the Editor of Bulletin of TICMI (since 1997);
- the Editor of Lecture Notes of TICMI (since 2000);
- the Associated Editor of Hindawi Journal of Applied Mathematics (2006-2017);
- the Associated Editor of Applicable Analysis (since 2014);
- Reviewer of Zentralblatt fuer Mathematik (since 1974);
- Reviewer of Mathematical Reviews (since 1999).

He likes to be with his family: with his wife, his two children and their families including four grandchildren.

We wish him continued success.

Natalia Chinchaladze
Tbilisi, Georgia

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