

# Curriculum Vitae of László Babai

**Personal.** Born in 1950, Budapest, Hungary.

Citizenship: Hungarian. Permanent resident of the U. S.

## Affiliation

Department of Computer Science  
and  
Department of Mathematics  
University of Chicago  
*E-mail:* `laci@cs.uchicago.edu`

## Education, degrees.

D.Sc. in the Mathematical Sciences, 1984, Hungarian Academy of Sciences.

Ph.D. in the Mathematical Sciences, 1975, Hungarian Academy of Sciences.

Diploma in Mathematics, 1973, Eötvös University, Budapest.

Studied mathematics at Eötvös University, Budapest, 1968-73.

One semester at Leningrad State University, U.S.S.R. (1971).

## Positions held

University of Chicago, Department of Computer Science: professor since 1987 (visiting professor: 1984-86); joint appointment with the Department of Mathematics since 1995

Eötvös University, Budapest, Department of Algebra: professor, 1987-1994 (teaching positions held at same place from 1971)

Short-term visits at a number of universities and research institutes in the Soviet Union, Canada, the U.S., Germany, the Netherlands, Australia, France, Italy, Switzerland.

## Publications

Published more than 180 research papers in combinatorics, algebra, and theoretical computer science; many of them with coauthors. All but 5 appeared in English language in international periodicals (including the Annals

of Mathematics, *Inventiones Math.*, *J. Amer. Math. Soc.*), refereed conference proceedings, and conference volumes selected by program committees (including 25 papers in STOC and FOCS). Miscellaneous publications include popular articles on the theory of computing and obituaries, memorial articles and biographies, including extensive studies of the life and work of Paul Erdős.

**Research areas** Major areas: combinatorics, group theory, algorithms, complexity theory, and the many interactions of these fields.

Specific subareas include: permutation groups, symmetry and structure of combinatorial objects, extremal set theory, Ramsey theory, the linear algebra method and polynomials in the study of combinatorial and geometric objects and models of computation, the probabilistic method, random walks and finite Markov chains, combinatorial optimization, combinatorial and asymptotic properties of finite groups, combinatorial number theory, applications of algebra and number theory to explicit construction of combinatorial objects, computational complexity theory, randomized complexity, communication complexity, combinatorial models of computation, circuit complexity, interactive proofs, probabilistically checkable proofs, approximation algorithms and inapproximability, algorithms in combinatorics, algebra, number theory, and geometry; parallel algorithms, randomized algorithms, the graph isomorphism problem, computational group theory, algorithms in permutation groups and matrix groups; discrete dynamical systems, the Abelian Sandpile Model.

#### **Honors, awards.**

*The Llewellyn John and Harriet Manchester Quantrell Award for Excellence in Undergraduate Teaching*, University of Chicago, 2005

*Honorary doctorate*, Technical University, Budapest, 1999

*Gödel Prize*, awarded by the EATCS and ACM SIGACT (European Association for Theoretical Computer Science and ACM Special Interest Group on Algorithms and Computation Theory), presented at STOC'93, San Diego, 1993

T. Szele Prize, J. Bolyai Mathematical Society, 1993 (for mentoring and advising young researchers in mathematical sciences)

*Full member of the Hungarian Academy of Sciences* (elected 1994; corresponding member: 1990)

Hungarian State Prize, 1988

- Mathematical Prize*, Hungarian Academy of Sciences, 1983 (an annual prize founded by Paul Erdős)
- G. Grünwald Prize, J. Bolyai Mathematical Society, 1972 (a prize for work by mathematicians under 30)
- K. Rényi Prize, J. Bolyai Mathematical Society 1971 (a prize for research papers by students)

### **Congress Lectures**

- Plenary lecture at the *AMS Regional Meeting*, University of Michigan, Ann Arbor, March 1-3, 2002
- Plenary lecture at the *International Congress of Mathematicians*, Zürich, 1994
- Plenary lecture at the *First European Congress of Mathematics*, Paris, 1992.
- Invited section speaker at the *International Congress of Mathematicians*, Kyoto, 1990.

### **Named lectureships**

- Carl J. Rees Distinguished Lecturer, May 2008, University of Delaware
- John M. Chemerda Lecturer in Science, Penn State University, November 1997
- Pólya Lecturer, M.A.A. 1996-98
- André-Aisenstadt Chair, Université de Montréal, Fall 1996 (two two-week series of lectures)

### **Other lecture series given include:**

- Vertex-transitive graphs, diameter of groups, and computation*, Centre Bernoulli, Lausanne, Switzerland, May 2007
- The Abelian Sandpile Model*, Centre Bernoulli, Lausanne, Switzerland, May 2007
- Polynomial-time algorithms for black-box groups*, “Groups and Geometries” conference, Milan, Italy, May 2000
- Combinatorial Models and Algebraic Questions in the Theory of Computing*, “Current Developments in Mathematics” conference, Harvard, November 1999

*Statistical Methods in Group Algorithms*, Workshop on Groups and Probability, Hebrew University, Jerusalem, March 1998  
*Statistical methods in group algorithms*, Groups - St. Andrews 1997 at Bath, Bath, U.K., July 1997  
*Communication Complexity*, Dipartimento di Scienze dell'Informazione, Università di Roma "La Sapienza," Rome, July 1996  
*Transparent proofs and inapproximability*, École Normal Supérieur, Paris, March-April 1994.  
*Complexity of computation in finite groups*, Workshop on Group Actions, Australian National University, Canberra, June-July 1993

**Other recent invited lectures at conferences, workshops, thematic semesters** include:

*Visualization Day*, NYU and CCNY, April 30, 2008  
*Groups and Computation* workshop, Ohio State U., March 18, 2008  
*AMS Special Session on Expanders*, Jan 8, 2008  
*Arithmetic Combinatorics special program*, Institute for Advanced Study, Princeton, Nov 13, 2007  
*Lie Groups, Representations, and Discrete Mathematics* workshop, Institute for Advanced Study, Princeton, Feb 5-10, 2006  
*New England Discrete Mathematics Day*, Worcester Polytechnic Institute, May 3, 2003 (1-hour invited address)

**Recent colloquium lectures** include:

Dartmouth College, Dept. Math. Colloquium, April 10, 2008  
Univ. Illinois at Urbana-Champaign, Dept. Math. Colloq. Oct 11, 2007  
Université Paris-Sud (Orsay), Lab. Rech. Informatique Colloq., March 2007  
University of Illinois at Chicago, Dept. Math. Colloq., Dec 2006  
Emory University, Dept Math and CS, "Distinguished Lecture" May 2006  
Penn State, Dept. Computer Science Colloquium, 2004

### **Award Committee and recent Program Committee membership**

Gödel Prize award committee chair (ACM SIGACT - EATCS),  
2005  
Pólya Lectureship award committee chair (MAA), 2005  
Program Committee Chair, ACM STOC (Symp. on Theory of  
Computing), 2004.  
Gödel Prize award committee member (ACM SIGACT - EATCS),  
2003, 2004  
Pólya Lectureship award committee member (MAA), 2002–2004

### **Grants.**

Principal Investigator, National Science Foundation Grant CCR-  
9732205 (Univ. of Chicago, 8/98-7/01, extended through  
7/02)  
Principal Investigator, National Security Agency Grant MDA904-  
1-0033 (Univ. of Chicago, 1/97–1/99)  
European Science Foundation Conference Grant: “Group The-  
ory: Finite to Infinite” conference, July 1996, Castelve-  
chio Pascoli, Italy (European Science Foundation, European  
Mathematical Society)  
Principal Investigator, National Science Foundation Grant CCR-  
9014562 (Univ. of Chicago, 1991-1994).  
Principal Investigator, together with Janos Simon, National Sci-  
ence Foundation Grant CCR-8710078 (Univ. of Chicago,  
1987-90).

### **Professional experience**

Teaching, research, advising graduate students in computer sci-  
ence and in mathematics as well as undergraduates at the  
University of Chicago, since 1984. Chair of the Computer  
Science Department Graduate Committee, 1996–2005.  
Teaching, research, advising undergraduate and graduate stu-  
dents at Eötvös University, Budapest, Department of Alge-  
bra, 1973–1994.  
Part-time teaching and curriculum development for Informatics  
(Computer Science) majors at the School of Electrical Engi-  
neering, Technical University, Budapest (1987–89).

Part-time consulting at the Institute of Computers and Automation of the Hungarian Academy of Sciences, 1980-83.

### **Undergraduate and pre-college mentoring; Research Experience for Undergraduates**

Mentored middle school students, high school students, and a large number of college students.

Each summer since 2002, taught series of courses under the general title “Discrete Mathematics” in the VIGRE REU program of the Department of Mathematics, University of Chicago. In addition to teaching, individually supervised several undergraduates’ research. These included 2 blocks of 4 weeks each each year since 2002, and additionally a 3-week “apprentice program” each year since 2004.

### **Ph. D. dissertations supervised**

Currently advising 4 graduate students and mentoring several more. Completed Ph. D. dissertations supervised:

Sourav Chakraborty: “Models of Query Complexity for Boolean Functions,” 2008

Murali K. Ganapathy: “Robust Mixing,” 2006

Aytek Erdil (coadvised with Roger Myerson): “Two-sided matching with ties,” 2006

Daniel Štefankovič: “Algorithms for Simple Curves on Surfaces, String Graphs and Crossing Numbers,” 2005

Evelina Toumpakari (coadvised with Steven Lalley): “On the Abelian Sandpile Model,” 2005

Thomas Hayes (co-advised with E. Vigoda): “Rapidly mixing Markov chains,” 2003 (STOC Best student paper, 1993, post-doc at Berkeley)

Samuel Kutin (co-advised with P. Niyogi): “Algorithmic stability and ensemble-based learning,” 2002

Peter Kimmel: “Communication Complexity Theory,” 1997

Barry Guiduli: “Spectral Extrema For Graphs,” 1996

Satya V. Lokam: “Algebraic and Combinatorial Methods in Computational Complexity Theory,” 1996

Katalin Friedl: “Decomposition of Matrix Groups and Algebras,” 1994.

- Robert M. Beals: “Algorithms for Finite Groups,” 1993 (NSF Postdoctoral Fellowship, IAS Postdoctoral Fellowship - Princeton)
- José Augusto Ramos Soares: “Graph Spanners,” 1992.
- Albert J. Goodman: “Automorphism Groups of Graphs: Asymptotic Problems,” 1992 (Sloan Dissertation Fellowship, NSF Postdoctoral Fellowship)
- Carsten Lund: “The Power of Interaction” (jointly supervised with Lance Fortnow), 1991 (ACM dissertation award)
- Mario Szegedy: “Algebraic Methods in Lower Bounds for Computational Models with Limited Communication” (jointly supervised with J. Simon), 1989 (received the Gödel Prize in 2000 and in 2005)
- Péter Hajnal: “Complexity of Graph Problems” (jointly supervised with Janos Simon), 1988
- Gábor Tardos: “Constructions in Universal Algebra,” 1988 (received the Paris Mayor’s Award for young mathematicians at the First European Congress of Mathematics, Paris, 1992)
- Lajos Rónyai: “Algebraic Algorithms” 1987 (elected “Corresponding member of the Hungarian Academy of Sciences,” 2000)
- Tamás Lengyel: “Some Combinatorial and Probability Theoretical Problems of Cluster Analysis,” 1986
- Péter P. Pálffy: “Group Theory Methods in Combinatorics and Universal Algebra” (jointly supervised with E. Fried), 1983 (elected “Corresponding member of the Hungarian Academy of Sciences,” 2003)

### **Journals and programs founded**

- Founder and Editor-in-Chief of the open access online journal **Theory of Computing** (<http://theoryofcomputing.org>) since 2004
- Co-founder, designer and coordinator of **Budapest Semesters in Mathematics**, a study-abroad program for North American undergraduates (since 1984).
- Co-founder and one of the Editors-in-Chief of the journal **Combinatorica** (since 1980; publisher: Springer).
- Co-founder and Series editor (1996-2000) of the “Bolyai Society Mathematical Studies” (1996-present; distributed by the

A. M. S. and subsequently by Springer)

### **Additional editorial service**

Member of the Editorial Board of “The Electronic Journal of Combinatorics” (since 1994; journal started in 1994)

Member of the Editorial Board of the electronic journal “Chicago Journal of Theoretical Computer Science” (since 1994; journal started in 1995)

Member of the Editorial Board of the journal “Combinatorics, Probability and Computing” (since 1991, journal started in 1992, Cambridge University Press).

Member of the Editorial Board of the “Journal of Algebraic Combinatorics” (since 1990, journal started in 1992; publisher: Kluwer)

Member of the Editorial Board of the “Journal of Combinatorial Theory, Ser. A” (since 1991, Academic Press/Elsevier)

Member of the Editorial Board of “Acta Mathematica Hungarica” (Budapest, since 1990)

STOC 2004 Special issue editor for the SIAM Journal of Computing

Member of the Publication Board of J. Bolyai Mathematical Society, Hungary, since 1996

Member of the Editorial Board of the journal “Information and Computation” (1987–1995).

Member of the Editorial Board of the “International Journal of Foundations of Computer Science” (1989-1995)

Member of the Editorial Board of the journal “Computational Complexity” (1989-2003, journal started in 1991; publisher: Birkhäuser)

Member of the Editorial Board of “SIAM Journal on Computing” (1992-94)

### **Language skills.**

Native tongue: Hungarian. Fluent in English, German, and Russian.