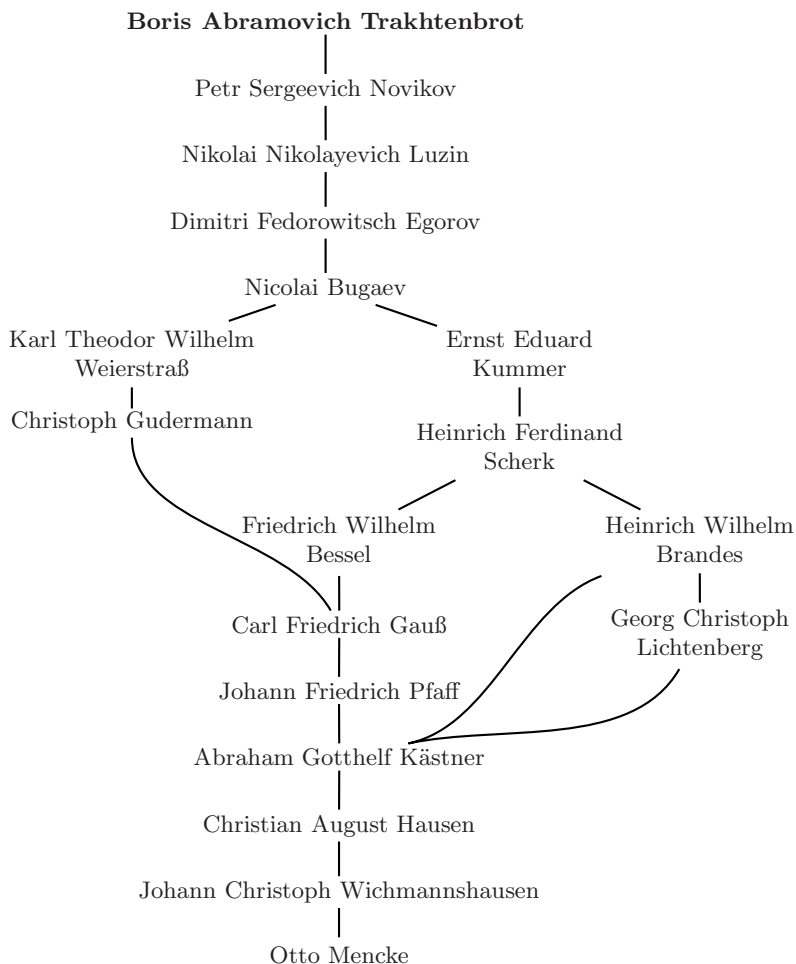


# Boris A. Trakhtenbrot\*: Academic Genealogy and Publications

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## 1 Trakhtenbrot's Genealogy

According to the Mathematics Genealogy Project (at <http://genealogy.math.ndsu.nodak.edu>), Trakhtenbrot's ancestral dag is rooted in Otto Mencke (who received his degree in 1666, but whose advisor is not listed):



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\* Sometimes transcribed as Trahtenbrot, Trachtenbrot, Trajtenbrot. His patronymic “A.” is variously spelled: Abramovich, Avraamovich, Avramovich.

The next section enumerates Trakhtenbrot's 16 doctoral students, the titles of their dissertations, and their own academic progeny. It is followed by a bibliography of Trakhtenbrot's hundred-plus publications, including 7 books.

## 2 Trakhtenbrot's Progeny

There follows a list of Trakhtenbrot's 16 doctoral students, their 56 students, and their 13 students, in turn, for a grand total of 85 known academic descendants – to date.

1. Miroslav Kratko, *Unsolvability of Completeness Problem in Automata Theory*, Institut of Mathematics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk (1964)
  - (a) Oleg Revin (1974)
  - (b) Valery Pavlenko (1979)
  - (c) Miroslav Pritula (1983)
  - (d) Yuri Yatsyshyn (1988)
  - (e) Igor Yanovich (1989)
  - (f) Andrei Nazarok (1989)
  - (g) Andrei Khruzin (1990)
2. Nikolai Beljakin, *About the External Memory of Turing Machines*, Institut of Mathematics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk (co-supervised with Petr Novikov) (1964)
  - (a) Valery A. Ganov (1975)
  - (b) Elena G. Nikiforova (1987)
  - (c) Alla N. Gamova (1992)
  - (d) Leonid N. Pobedin (1993)
  - (e) Ruslana V. Ganova (1998)
  - (f) Evgeniya V. Gailit (2004)
3. Janis Barzdins, *Universality Problems in the Theory of Growing Automata*, Institute of Mathematics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk (1965)
  - (a) Audris Kalnins (1971)
    - i. Edgars Celms (2007)
    - ii. Valdis Vitolins (2007)
  - (b) Evalds Ikaunieks (1973)
  - (c) Janis Kalnins (1974)
  - (d) Jānis Bičevskis (1979)
    - i. Guntis Arnicans
    - ii. Girts Karnitis
    - iii. Viesturs Vezis
    - iv. Jānis Zuters
  - (e) Karlis Podnieks (1979)
  - (f) Mihails Augustons (1983)
  - (g) Andrejs Auzins (1988)



**Fig. 1.** On the occasion of the “Logic at Botik ’89” symposium in Pereslavl-Zalesski (from left to right): V. Yu. Sazonov, J. M. Barzdins, R. V. Freivalds, A. Ja. Dikovskiy, B. A. Trakhtenbrot, M. K. Valiev, M. I. Kratko, V. A. Nepomnyashchy

- (h) Maris Treimanis (1988)
  - (i) Juris Strods (1988)
  - (j) Alvis Brazma (1989)
  - (k) Juris Borzovs (1989)
    - i. Guntis Urtāns (unofficial advisor) (2003)
    - ii. Baiba Apine (2003)
    - iii. Mārtiņš Gils (2005)
    - iv. Darja Šmite (2007)
  - (l) Ilona Etmāne (1990)
  - (m) Karlis Cerans (1992)
  - (n) Uģis Sarkans (1998)
  - (o) Girts Linde (2004)
4. Valery Nepomnyashchy, *Investigation of Bases and Sufficient Classes of Recursive Functions*, Institute of Mathematics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk (1967)
- (a) Kostovsky Valery (1986)
  - (b) Sergey Vorobyov (1987)
  - (c) Nikolay Shilov (1987)
    - i. Natalia Garanina (2004)



**Fig. 2.** On the banks of the Volga, after the (followup) “Logical Foundations of Computer Science” symposium, held near Tver in July 1992 (from left to right): M. N. Sokolovskiy, M. I. Dekhtyar, M. K. Valiev, B. A. Trakhtenbrot, V. Yu. Sazonov, I. A. Lomazova, V. N. Agafonov

- (d) Alexander Sulimov (1991)
  - (e) Alexander Ustimenko (1997)
  - (f) Igor Anureev (1998)
  - (g) Tatiana Churina (2000)
  - (h) Vitaly Kozura (2004)
  - (i) Elena Okunishnikova (2004)
  - (j) Aleksey Promsky (2004)
5. Alexei Korshunov, *An Investigation of Weight, Diameter and Ranks of Automata with a Big Memory*, Institute of Mathematics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk (1967)
    - (a) Miron N. Sokolovskiy (1979)
  6. Mars K. Valiev, *On Complexity of Word Problem for Finitely Presented Groups*, Institute of Mathematics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk (1969)

7. Valery Agafonov, *On Algorithms, Frequency and Probability*, Institute of Mathematics, Novosibirsk (1969)
8. Djavkathodja Hodjaev, *On Complexity of Computations on Turing Machines with Oracles*, Institute of Cybernetics, Tashkent (1970)
9. Zoya Litvintseva, *Complexity of Some Algorithmic Problems for Groups and Semigroups*, Novosibirsk State University (1970)
10. Rūsiņš Freivalds, *Completeness up to Coding for Systems of Multiple-Valued Functions*, Institute of Mathematics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk (1972)
  - (a) Efim Kinber (1974)
  - (b) Agnis Andzans (1983)
    - i. Līga Rāmana (2004)
    - ii. Ilze France (2005)
  - (c) Maris Alberts (1989)
  - (d) Daina Taimina (1990)
  - (e) Janis Kaneps (1991)
  - (f) Juris Viksna (1994)
  - (g) Andris Ambainis (1997)
  - (h) Juris Smotrovs (1999)
  - (i) Dainis Geidmanis (1999)
  - (j) Marats Golovkins (2003)
  - (k) Maksims Kravcevs (2006)
  - (l) Arnolds Kikusts (2007)
11. Anatoli Vaisser, *Problems of the Complexity and Stability of Probabilistic Algorithms*, Tomsk (Vladimir P. Tarasenko served as *de jure* advisor<sup>1</sup>) (1976)
12. Vladimir Sazonov, *On the Semantics of Applicative Algorithmic Languages*, Novosibirsk State University (1976)
  - (a) Alexei Lisitsa (1997)
13. Michael Dekhtyar, *On the Complexity of Relativized Computations*, Moscow State University (1977)
  - (a) Sergej Dudakov (2000)
14. Irina Lomazova, *Semantics and Algorithmic Logic for Programs with goto*, Institute of Mathematics of the USSR Academy of Sciences (Andrei P. Ershov served as *de jure* advisor<sup>1</sup>) (1981)
  - (a) Vladimir Bashkin (2003)
15. Alex Barel, *On Collective Behavior of Automata*, Tel Aviv University (co-supervised with Ilya Piatetski-Shapiro) (1984)
16. Alexander Rabinovich, *Nets and Processes*, Tel Aviv University (1989)
  - (a) Greta Yorsh (co-supervised with Shmuel Sagiv) (2007)

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<sup>1</sup> Tarasenko and Ershov generously volunteered to serve as official supervisors, so as to circumvent bureaucratic repression on the part of the official mathematical establishment, which would have endangered the careers of Trakhtenbrot's students.

### 3 Trakhtenbrot's Publications

Trakhtenbrot's books have been very influential and were translated into a wide range of languages, including English, French, German, and Japanese. His 96 additional publications span the period from 1950 until the present and have left indelible marks all over the field of theoretical computer science.

#### 3.1 Books

1. *Algoritmy i mashinnoe reshenie zadach* (in Russian) [*Algorithms and Automatic Computing Machines* = Алгоритмы и машинное решение задач], Gostekhizdat, 1st ed., Moscow, 95 pages. Issue 26 of the series *Popular Lectures in Mathematics*, 1957.
  - (a) *Wieso können Automaten Rechnen: Eine Einführung in die logisch-mathematischen Grundlagen programmgesteuerter Rechenautomaten* (German, translated from Russian), Deutscher Verlag der Wissenschaften, Berlin, 1959.
  - (b) *Los Algoritmos y la Resolución Automática de Problemas* (Spanish, translated from Russian), Editorial Mir, Moscow, 1977.
  - (c) (Japanese translation), Shigeo Kawano, Tokio-Toshio, 1959.
  - (d) *Algoritmy i automatyczne rozwiązywanie zadań*, Państwowe Wydawnictwo Naukowe, Warszawa (Polish), 1961.
  - (e) *Algorithmes et Résolution de Problèmes par des Machines* (French, translated from Russian), Editions Mir, Moscow; appears as part 2 of I. Yaglom, B. Trakhtenbrot, H. Ventsel, A. Solodovnikov, *Nouvelles Orientations des Mathématiques*, Editions Mir, Moscow, 1975.
2. *Algoritmy i mashinnoe reshenie zadach* (in Russian) [*Algorithms and Automatic Computing Machines* = Алгоритмы и машинное решение задач], 2nd ed., Fizmatgiz, Moscow, 120 pages, 1960.
  - (a) *Algoritmy a strojove reseni ulokh* (Czech, translated from Russian), Nakladatelstvi Ceskoslovenske akademie ved, Praha, 1963.
  - (b) *Algorithmes et machines a calculer* (French, translated by A. Chauvin from Russian), Dunod, Paris, 1963.
  - (c) *Algoritmy i mashinno resavane na zadachi* (Bulgarian, translated from Russian), Dyrzhavno Izdatelstvo "Tekhnika", Sofia, 1963.
  - (d) *Algorithms and Automatic Computing Machines* (translated and adapted from Russian by J. Kristian, J. D. McCawley, and S. A. Schmitt), in the series *Topics in Mathematics*, D. C. Heath and Company, Boston, 1963.
  - (e) Japanese translation, Tosho, Tokyo, 1964.
  - (f) *Algoritmi e Macchine Calcolatrici Automatiche* (Italian, translated from English), Progresso TecnicoEditoriale, Milano, 1964.
  - (g) *Algoritmalar ve Otomatik Hesap Makinalari* (Turkish), Turk Matematik Dernegi Yaynları, Istanbul, 1964.

- (h) *Introduction a la Teoria Matematica de las Computadoras y de la Programacion* (Spanish, translated from Russian), Siglo Veintiuno Editores SA, Mexico, 1967.
3. N. E. Kobrinski and B. A. Trakhtenbrot, *Vvedenie v Teoriiu Konechnykh Avtomatov* (in Russian) [*Introduction to the Theory of Finite Automata* = Введение в теорию конечных автоматов], Fizmatgiz, Moscow, 404 pages, 1962.
- (a) *Introduction to the Theory of Finite Automata* (translated from Russian; translation edited by J. C. Shepherdson), in: *Studies in Logic and the Foundations of Mathematics*, North-Holland Publishing Company, Amsterdam, 1965.
- (b) *Uvod do Teorie Konecnych Automatu* (Czech, translated from Russian), Nakladatelstvi Technicke Literatury, Praha, 1967.
- (c) *Einfuhrung in die Theorie endlicher Automaten* (German, translated from Russian), Akademie-Verlag, Berlin, 1967.
4. *Slozhnost' Algoritmov i Vychislenii* (in Russian) [*The Complexity of Algorithms and Computations* = Сложность алгоритмов и вычислений], Lecture Notes, edited by Novosibirsk University, 258 pages, 1967.
5. B. A. Trakhtenbrot and Ya. M. Barzdin, *Konechnye Avtomaty (Povedenie i Sintez)* (in Russian) [*Finite Automata (Behavior and Synthesis)* = Конечные автоматы (поведение и синтез)], Nauka, Moscow, 400 pages, 1970.
- (a) *Finite Automata: Behavior and Synthesis* (translated from Russian by D. Louvish; translation edited by E. Shamir and L. H. Landweber) in: *Series Fundamental Studies in Computer Science*, North-Holland, Amsterdam, and Elsevier, New York, 1973.
6. *Algoritmy i Vychislitelnye Avtomaty* (in Russian) [*Algorithms and Computational Automata* = Алгоритмы и вычислительные автоматы], Sovetskoe Radio, Moscow, 200 pages, 1974.
- (a) *Algorithmen und Rechenautomaten* (German, translated from Russian), Deutscher Verlag der Wissenschaften, Berlin, 1977.
- (b) *Sto SU Algoritmi: Algoritmi i racunski automati. Skolska Knjiga* (Horvat-Serbian, translated from Russian), Zagreb, 1978.
- (c) *Algoritmusok es absztrak Automatak* (Hungarian, translated from Russian), Muszaki Konivkiado, Budapest, Mir Konivkiado, Moskva, 1978.
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