

# A Labor of Love: The Mathematics Genealogy Project

*Allyn Jackson*

Harry Coonce is an early riser. He gets up between 5:30 a.m. and 6:00 a.m., and the first thing he does is check his email. Then he starts the coffee, and in a little while his wife, Susan Schilling, who is a computer scientist, comes down to join him for a cup. “I got 32 names this morning,” Harry tells Susan as he taps away, entering the new information into the database.

Coonce, a mathematician at North Dakota State University, is the managing director of the Mathematics Genealogy Project, a database of mathematics doctorate recipients and their advisors that stretches from Leibniz (Dr. jur, 1666, Universität Altdorf) up to the present day and contains more than 100,000 names. For Coonce, the careful day-to-day tending of the Mathematics Genealogy Project database has simply become a way of life. For mathematicians the world over, the database has become a standard reference tool, made continually more complete and reliable through contributions and corrections of users.

Coonce is a tall, white-haired man who walks with a cane and has a penchant for contrarian humor. Back in the early 1990s, when he first discussed with other mathematicians the idea of a database of mathematics Ph.D.'s, the reaction was: This is not mathematics, it's not mathematics history—and it can't be done. “Well, they were right on that one!” Coonce said. Still, he and his wife started discussing the possibilities. This was just at the time when use of the World Wide Web was spreading throughout the mathematical community, and they realized the Web offered the perfect way to present and share the information. So in the spring of 1996, Coonce sent a letter to the couple of hundred mathematics departments that indicated in the AMS *Professional Directory* that they had a doctoral program. The letter requested the names and dissertation titles of doctorates and the names of their advisors. Only about 25 to 30 percent responded, but that was enough to get started. Most responses came by snail-mail, some by email, some by fax. By September that year Coonce had posted the first batch of 3,500 names. The project gained visibility when he gave

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a talk about it the following January at the Joint Mathematics Meetings in San Diego.

Coonce was at the time on the faculty of Mankato State University (now called Minnesota State University, Mankato). The department gave some support for students to help him with the Mathematics Genealogy Project, but mostly he paid out of his own pocket. After he retired in 1999 he was able to continue to use an office at the university to work on the project. But by 2002 the university administration wanted him out: According to Coonce one dean flatly said, “This project has no academic value.” Coonce put a notice on the Mathematics Genealogy Project website asking people to write to the dean if they disagreed with this assessment. “He was swamped!” Coonce recalled.

But it was clear the project needed a new home, and feelers came from other institutions, one of them being North Dakota State University. Coonce recalled his conversation with the dean there: “I asked for a professorship, an office, a computer, and funding. He said no. How could I pass up a deal like that?” In the end the university offered Coonce an adjunct faculty position and an office, so he bought his own computer and moved in. The best part of the deal was “a marvelous young student, Mitch Keller,” said Coonce. “He had all the competencies of a computer geek—a good geek. I'd gone through at least five geeks, all of them good, but every year it was, ‘Find a new geek.’” But Keller stayed on. He is now a mathematics graduate student at Georgia Tech and continues to work on the Mathematics Genealogy Project. Coonce says Keller is the one most likely to take over the project when the day comes that Coonce himself can no longer continue to work on it.

Before word really spread about the project, Coonce did whatever he could to get information to add to the database. One source was *Dissertation Abstracts*, which contains titles and abstracts of Ph.D.'s granted in the United States and, importantly for the Mathematics Genealogy Project, began listing the names of advisors around 1995. “Every Friday night about 6:00 p.m. I would load up about twenty-five volumes of *Dissertation Abstracts* and go to my office,” Coonce recalled. “I would work through these volumes on the weekend.” In 1999 the Mathematical Sciences Research Institute offered Coonce a one-month membership,

which allowed him to publicize the project among mathematicians and to make many contacts that were crucial to the project's development, including MSRI director David Eisenbud, whom Coonce said has been a great supporter.

In 2002 Coonce visited the Universität Bielefeld, where Ulf Rehmann set up a mirror site and helped Coonce make contacts with mathematicians in German universities who could contribute information for the database. Coonce got photocopies of listings of new Ph.D.'s from German universities that had appeared in the *Mitteilungen*, the membership publication of the Deutsche Mathematiker Vereinigung (German Mathematical Society). (The *Notices* lists names of new Ph.D.'s at U.S. universities, but, unfortunately for Coonce, the names of the advisors do not appear. There is a spike in the number of entries in the Mathematics Genealogy Project in 1964, the one year when the *Notices* did include advisors' names.) Bit by bit, with information being added from a variety of sources, the database grew.

Now in its eleventh year, the Mathematics Genealogy Project has become so well known that about nine hundred new entries come in each month. Coonce does some vetting of new entries, such as checking whether a new Ph.D.'s advisor is already in the database or in MathSciNet. For Ph.D.'s from U.S. universities, he cross-checks against *Dissertation Abstracts*. Although mistakes inevitably creep in, so many people use the database that many errors are eventually found and corrected. For example, in July 2006, Google cached a Mathematics Genealogy Project entry for Mohammed Javad Larijani, who is the director of the Institute for Studies in Theoretical Physics and Mathematics in Tehran. He has also served in high positions in the Iranian government and has sometimes been confused with his more famous brother, Ali Larijani, the chief nuclear negotiator for the Iranian government. The cached Mathematics Genealogy Project entry for Mohammed Larijani said that he had received a Ph.D. in model theory from the University of California at Berkeley in 1980, under the direction of Robert Vaught. But later in 2006 the entry for Larijani was removed: He had indeed been a graduate student at Berkeley but did not finish a doctorate.

An entry in the Mathematics Genealogy Project contains the name of the doctorate recipient, the name of the doctorate-granting institution, the year the degree was awarded, the title of the thesis, and the name of the thesis advisor. This year, links to individuals' publication lists in MathSciNet have been added. For those whose biographies appear in the MacTutor History of Mathematics website (<http://www-gap.dcs.st-and.ac.uk/~history/>), a link is provided.

In 2006 a novel feature was added: a list of the fifty people who have advised the most Ph.D. stu-

### Mathematics Genealogy Project

The URL for the main site of the Mathematics Genealogy Project is <http://www.genealogy.math.ndsu.nodak.edu/>. There are also mirror sites at the AMS, the Universität Bielefeld, the University of Mississippi, and the Instituto de Matemática Pura e Aplicada in Rio de Janeiro.

Readers are encouraged to check their own information in the Mathematics Genealogy Project and to submit new information. The website has an online submissions form. Information on paper may be sent by postal mail to: Harry B. Coonce, The Mathematics Genealogy Project, P. O. Box 457, Vernon Center, MN 56090.

dents. Topping the list is Ronold Wyeth Percival King, who advised 100 Ph.D. students at Harvard between 1944 and 1984. If his name is not so familiar, that is because King's Ph.D. was in physics and he worked in that field and in electrical engineering. His inclusion in the Mathematics Genealogy Project demonstrates the project's inclusiveness: It accepts entries not only in mathematics but also in closely aligned fields, especially statistics and computer science.

Among the more familiar names in the list of "top 50" advisors is Felix Klein, who had a mere 58 students. But the Mathematics Genealogy Project also lists the number of "descendants"—that is, the number of students, plus the number of students of students, and so forth—and by this statistic, Klein stands out, with a whopping 26,563. Two of Klein's students, David Hilbert and Ferdinand von Lindemann, also made the "top 50" list (Hilbert is surely familiar to *Notices* readers, and Lindemann, of course, is famous for the first proof of the transcendence of  $\pi$ ). The Mathematics Genealogy Project website notes that in former times the relationship between advisors and students could be quite different from what it is today, so some of the earlier entries could indicate a mentor/student relationship. Including such entries is justified, because the true goal of the project is to use these relationships to trace the intellectual history of the mathematical sciences.

In addition to the sponsorship of North Dakota State University, the Mathematics Genealogy Project receives support through a grant from the Clay Mathematics Institute and through donations by many individuals. The AMS also gives some modest support, including providing a mirror site and a booth for the Mathematics Genealogy Project at the Joint Mathematics Meetings.

When Coonce shows up at meetings, he is inevitably asked the same question: Are you still running the project? His stock answer is, "No, the project is running me." Why did he stick to it through the years, spending his weekends with *Dissertation Abstracts* and adding entries while sipping his morning coffee? Why did he care so much? His answer is simple: "It's a labor of love."