In April 2009 Bei Zeng joined the happy, if rather exhausted, tribe of freshly-minted MIT physics Ph.D.s. She’d spent the past four years in the quantum information theory lab of Professor Isaac Chuang, a leader in the field of theoretical quantum information science, collaborating with luminaries such as Peter Shor, Morss Professor of Applied Mathematics. And while talented young people from around the world travel along varied pathways to our department, few of them arrive at 77 Massachusetts Avenue as seasoned professional chess champions—from the age of twelve.

Growing up in China’s southwestern Sichuan province in the city of Chengdu, long known as the home of the beloved panda bear, Bei was accustomed to her father’s long and regular absences from home. As the Head Coach of China’s national chess team, Zilin Zeng was required to work in Beijing. A self-taught chess master in the days when the game was relatively unknown in his country, Mr. Zeng channeled his talent into coaching when personal circumstances made traveling to international competitions problematic. One of his star students, Shilan Liu, became the first female All-Asia Chess Grandmaster in 1982. As the sister of Bei’s mother, Ms. Liu was not only Bei’s aunt, but the chief role model in her growing passion and ambition for chess.

When she was eight years old, Bei succeeded in persuading her father to begin coaching her in chess. Recognizing his daughter’s intellectual talent, he was reluctant to train her for a career where even the best participants typically peaked by their 20’s or early 30’s. Zilin Zeng’s preference was for Bei to attend one of China’s top universities and pursue an academic career. Nevertheless, chess, and Bei, prevailed, and by the age of nine she was competing locally. At ten, she was a national competitor, and at twelve years-old, Bei turned professional when the Chinese government awarded her with a salary and a position on the regional chess team.

Bei successfully competed as a professional Chinese chess champion for the next six years, and likely would have continued on the traditional chess career trajectory had it not been for the startling achievement of a group of innovative computer scientists half a world away at IBM’s Watson Research Center in New York. In May 1997, the IBM team’s latest supercomputer, dubbed “Deep Blue,” succeeded in beating reigning World Chess Champion Garry Kasparov in a chess match. For Bei, this was a defining moment as she realized her father had been right, after all. Chess, as a career path, now had demonstrated limitations;
academia, and physics, held a more promising future for an intellectually gifted young Chinese woman.

Bei earned her B.S. in physics and mathematics and M.S. in theoretical physics in 2002 from Tsing Hua University (dubbed by many as the “MIT of China”), before making her way to the U.S. for graduate studies at MIT. In a neat twist of fate, Bei found herself as a summer 2008 Research Intern at IBM Watson, where knowledge of her competitive chess background led to an invitation to participate in an employee-sponsored chess tournament. Bei competed as the only woman in the group, and against some of the very same computer scientists who’d first developed the renowned Deep Blue. At the end of a long afternoon of five chess matches, an undisputed winner emerged: Bei Zeng.

This fall, Bei begins a postdoctoral fellowship at the Institute for Quantum Computing at Canada’s University of Waterloo. She will maintain her ties to Cambridge, however, as she’ll commute regularly to see her husband Jingen Xiang, a Research Associate at the Harvard-Smithsonian Center for Astrophysics. The couple expects their first child in June, and Jingen’s mother will join the household to help the growing family. Jingen is also an avid chess player, although, confides Bei, he’s not quite as good as he thinks he is. Considering who his spouse is, we admire his courage to play at all.

**physics@mit**: Bei, our warmest congratulations on the successful defense of your Ph.D. thesis this spring! Did you find your thesis talk to the faculty committee more, or less, arduous than a championship chess match?

**Bei**: Well, I see them as totally different things. Academic talks are something where it’s possible to make everyone happy. Although it requires, of course, hard work before the talk, you can at least be very relaxed during it. A chess match, on the other hand, is something very intense: you need to focus on the game for every single second throughout the game. Frankly, I like the feeling of focus and intensity during the chess games a lot; I think such feelings can really bring out your potential and inspire your creativity.

**physics@mit**: We’ve learned a bit about why you left a remarkably successful career in chess to pursue academic research in physics. Can you tell us why you chose physics, and in particular, the study of physics at MIT?

**Bei**: A chess career is very challenging, and I really loved it. It was truly a big decision in my life to switch to something else, and I wanted something at least as equally demanding as chess.
Although at the time I wasn’t completely sure what an academic life in physics would be like, I imagined it would at least be as challenging as competitive chess, and I believe I was right. Physics at MIT is one of the best places in the world to pursue these challenges, so I came to the right place.

**physics@mit:** You’ve credited your aptitude for eidetic memory, as well as intuition and experience, for much of your success in chess. Have any of these strengths also informed your research in physics and quantum information theory? If so, how?

**Bei:** I should add one more thing, which is ‘character.’ For me, a chess career had developed almost all my character: religion (a true belief in what I am working on), which led to devotion and dedication (so mundane things were not important), as well as to concentration. It’s easy for me to focus on thinking about something continuously for hours, days, weeks and even longer. I believe that’s where my aptitudes for memory, intuition and experience really come from. Chess was my whole life and now, physics is. I don’t expect that I will switch again to something else, for a second time in my life.

**physics@mit:** There are innumerable fans of chess within the MIT community, particularly in the mathematics and physics departments. Have you ever played chess with the MIT Chess Club, or anyone else here at MIT?

**Bei:** Unfortunately, I almost never play at all nowadays. Chess was my life for so long; I love it almost too much. In this sense, playing chess now is not a relaxation but almost a kind of pain or loss. Whenever I do sit before a chess table confronting an opponent, I focus intensely on the game, putting all my energy into it, and forget about anything else (that is how I was trained, and which I can never forget). Well, now I need to save my energy for physics!

**physics@mit:** Bei, returning to IBM as a research scientist was your original post-Ph.D. career plan. With budget cuts in industry temporarily closing that door and bringing you back to academic physics, what are your current plans for the next phase of your career? Which area(s) of physics would you like to focus upon, and why? And where do you hope these plans will eventually lead you?

**Bei:** This is just life; in one sense, you can hardly have any concrete plans. However, what is certain for me is that I will devote my whole life to studying quantum information theory. I really like the feeling of being dedicated and devoted to something, and I’m not really concerned about having one specific place where I would need to be to make my dream come true. There are many good places in the world where I can pursue my career in quantum information theory, and I simply believe I’ll just be somewhere among them. As long as I can always focus on my research, I am totally satisfied with my life. The most important thing is that I know what I want, so I’m ready to make the right decisions at any time.

—Carol Breen, Communications Administrator
MIT Department of Physics