A Balancing Act
By Bonnie Blake
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Interviewee: Carolyn Gordon

Carolyn Gordon's life is based on an equilibrium of surprise and consistency. Gordon has always been a reserved person who relies on a strong support system. Despite this, Gordon integrated a degree of impulsivity into her career. This balance inspired Gordon from the beginning, and keeps her passionate.

Gordon's sister taught her to treat math as a puzzle. Gordon adopted this mentality, and appreciated math's structure. With continued learning, Gordon came to love the imaginative side of mathematics. Still appreciative of the puzzle-like qualities, but especially interested in the creativity behind approaching a problem, Gordon began to discover balance in math. She was naturally adept in math from a young age, only ever straying away from geometry.

Gordon began her career with a math degree at Purdue when women didn't typically pursue careers in math, so she had no clear plan for herself after finishing her degree. Gordon remained uncertain until the last year of her studies, when an encouraging professor suggested she continue her education at graduate school.

Gordon recounts how an academic career sounded exciting, but she did not consider it seriously until her professor gave her the idea. Her professor's support gave Gordon the confidence to pursue her passion. "Wow he thinks I could do that", she recalls thinking. The next day, she decided to apply for graduate school.

Gordon soon enrolled in Washington University. She began with the intention of studying abstract algebra, but to earn her degree Gordon had to take classes in geometry – the one area of math she avoided. After taking the class, Gordon realized geometry was not how she'd expected. She actually came to love it. Gordon kept open minded to achieve her degree. This mentality rewarded her. After her geometry based classes, Gordon was led down a path which would eventually deem her a geometer.

Gordon has always held the philosophy that uncertainty is beneficial. Keeping an open mind early in her career, Gordon continued her education and found an unexpected love of geometry that would change the course of her career. Gordon has heard students say they are nervous about not knowing what to do in their career. To Gordon, that's wonderful. "The more you explore, you'll find things you never dreamed you wanted. If you know what you want to do at the start and stick to it, you might miss out on something you really love".

Entering graduate school, Gordon was faced with numerous new challenges – one being research. In a classroom setting, all problems have a known solution. Whereas in research, there is no telling if a solution exists. Gordon experienced self doubt in her early research, as the quick gratification of solving shorter problems ceased… "At the research stage you work for years on a problem and wonder 'can I do this? Am I capable?'". To keep from sending herself negative "stress messages", as she calls them, Gordon started tai-chi – which remains a source of calm for Gordon. There have been times she would go off, practice tai-chi, and suddenly a new approach to a math problem would come to her. While Gordon keeps a habitual balance in her life as a whole, when affected by stress, Gordon turns to tai-chi – perhaps subconsciously seeking its stabilizing nature.

Post-graduate school, Gordon researched problems on her own accord, one being her "Can you hear the shape of a drum?" problem. As her most accredited problem, Gordon – alongside David Webb and Scott Wolpert – investigated whether drums of different shapes make the same tones or if shape dictates sound. Gordon's research responded negatively to the question, as she and her partners constructed theoretical drum shapes which create the same sounds. Gordon and Webb were awarded the Mathematical Association of America Chauvenet Prize in 1996 for their paper on the subject.

Despite her accomplished research, when asked what her proudest achievement is, Gordon responds, "overcoming my shyness to teach in front of a class". Gordon has always been shy, and, in hindsight, her most significant self doubt was never in her math, but internal confidence. She loves to teach, having taught math courses at Dartmouth College for many years, but has always feared public

speaking. Even in retirement she jokes about a nervousness that "I've been faking all this time and they'll find me out". Although she means it jokingly, Gordon exhibits great humbleness and humility. "Math has always been a fun challenge for me, but this I had to overcome for myself".

Despite her shyness, one place Gordon found herself speaking up was women's math conventions. Gordon is adamant that for girls to pursue math, they need encouragement at all stages. She finds conversations on mathematics – in the classroom or otherwise – are frequently dominated by men. Gordon believes female lead workshops create spaces where women can ask questions and present their ideas in ways they may not be comfortable in co-ed settings. These workshops – namely, Sonia Kovalevsky day at Dartmouth and research sessions hosted by the Association of Women in Mathematics – have helped Gordon to personally find her voice. Gordon believes these environments are beneficial for young girls in math to counteract messages society teaches them – "math isn't for girls".

Gordon hopes with persistent encouragement, girls will feel confident in pursuing their math passions, without struggling to find their voice. Gordon recently retired, but recounts that throughout her teaching career, many gifted female students were reluctant to sign up for honors math courses, which Gordon suspects is an inconfidence developed through societal discouragement. Gordon likes to be a source of inspiration for these women – as her own professor was to her – encouraging them to push their abilities. She found when she recommended honors courses to her female students, they would almost always excel. "So much of it is building confidence", Gordon asserts, "and society works counter to that".

Every woman with a passion deserves this same balance of impulsivity and structured support. Had Gordon kept a narrow scope, she would not have discovered a love of geometry, let alone pursued graduate school. Simultaneously, Gordon's success relied heavily on ceaseless support from encouraging professors and other mathematicians. Nothing involving passion should be mutually exclusive: spontaneity and encouragement, timidness and public speaking, women and mathematics. All are taught to be conflicting, but Gordon proves otherwise by creating a balance. A balance to keep herself inspired. A balance to inspire generations to come.

I am Bonnie Blake, an eleventh grade student at Hanover High School. I am most interested in the intersection of math and science, especially in the biological sciences. Outside of school, I dance ballet at Lebanon Ballet School, serve on the town of Norwich Solid Waste Committee, and tutor. I spend most weekends dancing, studying, or skiing/hiking with my family (depending on the season!)