Closing the Gender Gap in Tech Entrepreneurship: An Analysis of Tech Entrepreneurship and Mentorship Programs in Undergraduate Education

Bilge D. Kocak

Currently, women-led startups receive only 2.3% of venture capital (VC) funding (Bittner), even though women-led tech startups have 35% greater return on investment and 12% higher revenue than all-male startups ("Facts"). To change these statistics, creating unique frameworks that enable women to overcome perceptual and social barriers that keep them from realizing their true potential is essential. This study aims to propose specific suggestions for Villanova University to better contribute to reducing the gender gap in tech entrepreneurship during undergraduate education. First, to observe the trends in comparable institutions, the tech entrepreneurship opportunities for women and mentorship programs on entrepreneurship in 15 other universities are investigated: six of these universities are selected due to their shared Catholic background, and the remaining ones are chosen due to their proximity to Villanova University. In the second part of the study, through an analysis of the 2011-2020 datasets on the engineering entrepreneurship minor obtained from the College of Engineering, a case study on the tech entrepreneurship trends at Villanova University is conducted. Our analysis shows that when the impact of the female to male student ratios in engineering majors are disregarded through a normalization, the pure female engineer interest in this minor is still only 43.5% of the total engineer interest, revealing room for improvement. By creating more gender-specific seed funding opportunities, incubator programs, and various types of mentorship activities through a database, Villanova University can better help undergraduate women realize their true potential in tech entrepreneurship.

Introduction

New analysis by Boston Consulting Group shows that if women and men participated equally as entrepreneurs, global GDP could rise by 3% to 6%, boosting the global economy by $2.5 to $5 trillion (Unnikrishnan). Yet, although female-founded startups take substantially less time to exit than the broader market, women are underrepresented as investors and company founders (All). In the technology industry, the gender gap is quite noticeable: Female-founded tech startups make up nearly 20% of all VC-backed tech companies, but they bring in a lower percentage of all tech investment dollars: 12.2% in 2019 (All). There is an upward trend in the sheer number of female-founded, VC-backed tech startups, as they have grown significantly from 410 companies in 2009 to over 2700 in 2018 (All). Some recommendations to contribute to this positive trend include improving women's access to financial capital, focusing on human capital by providing training sessions, and increasing women's access to professional networks (Hanna).

A college environment is one of the most ideal places to implement these recommendations, since students could benefit from seed funding opportunities for their startups, participate in workshops, take classes, do internships, and gain access to an extensive network of people, including other students, alumni, and donors. There are many examples of successful startups founded by college students, including Microsoft and Facebook. Some newer startups founded on college campuses include Snap at Stanford ($29B valuation at initial public offering), Warby Parker at Wharton (~$2B valuation), and Brex at Stanford (~$1B valuation) (Xu). Therefore, it is worth investigating how a college environment could be shaped to help closing the gender gap in tech entrepreneurship.

A key point in this discussion is mentorship activities. While women learn by doing, their mentors become their role models, offer their expertise, and help them avoid making errors in decisions. 75% of women leaders maintain that mentoring plays an integral part in their careers (Laukhuf). However, over half of all women entrepreneurs do not have a mentor, and the main reasons for this are not asking a mentor for help (67%) or never encountering an appropriate person to serve as a mentor (52%) (Williams). There is a strong need for mentorship programs, especially in entrepreneurship education of women in technology, because "the severe underrepresentation of women in male-dominated fields such as entrepreneurship may exacerbate feelings of isolation and lack of

belonging, which could also influence women's performance in these settings". Additionally, "women's perceptions of male-dominated environments, such as entrepreneurship, as misaligned with their values or potentially detrimental to their performance may discourage them from opting into these spaces" (Morton).

This study aims to explore the types of programs and activities colleges could offer to reduce the gender gap in tech entrepreneurship, while focusing specifically on Villanova University as a starting point to create change. Through the organization of more programs, databases, and mentorship activities, colleges can become a great environment for women in tech entrepreneurship to encounter the appropriate people that could serve as mentors. For this reason, the tech entrepreneurship opportunities for women in comparable institutions to Villanova University are investigated, and to identify the current trends in Villanova University regarding women tech entrepreneurship, a detailed analysis of the datasets on the engineering entrepreneurship minor is conducted.

Methods

The selection of the comparable universities to Villanova University was done by my mentor Prof. Lauri Olivier. Since Villanova University is a Catholic Augustinian community of higher education, six additional Catholic universities were chosen for the purposes of this research. Nine more universities were selected due to their proximity to Villanova and having Accreditation Board for Engineering and Technology (ABET) accredited Engineering programs comparable to Villanova University.

To identify the opportunities in the 15 comparable universities selected, the keywords "tech entrepreneurship", "women entrepreneurship", "women tech entrepreneurship", and "seed funding" were used to do a web search targeting each college. The programs listed on the websites of the entrepreneurship centers of these colleges are also examined to make this qualitative analysis.

Villanova University's engineering entrepreneurship minor program, directed by Prof. Lauri Olivier, is the main program pursued by the students interested in tech entrepreneurship. Therefore, to extract the current trends in Villanova University on women tech entrepreneurship, the datasets on the engineering entrepreneurship minor program obtained from the College of Engineering for 2011-2020 were analyzed by creating pivot tables in Microsoft Excel. During these years, 206 students graduated from the University with completing this minor, and 200 of them were from the College of Engineering. Most of our analysis was on engineering students pursuing this minor for several reasons: we had more data regarding them, the number of people who were not in engineering was not large enough to be able to make claims about them, and our research was mainly supported by the College of Engineering. Investigating the number of students from different engineering majors, the gender ratios of the participants, participation from different colleges within Villanova, participation in the academic year and the summer institute program (E2SI), and the other minors that the engineering entrepreneurship students were pursuing constituted our analysis.

Tech Entrepreneurship and Mentorship Programs at Villanova University

Before discussing the possible programs that could be implemented on Villanova University's campus, we would like to mention the already-existing programs relevant to our research. We could not identify a program that focuses on tech entrepreneurship and is specific to women. Upon checking the programs and initiatives through the Villanova Innovation, Creativity, and Entrepreneurship Institute, we identified that two main opportunities for tech entrepreneurship at Villanova University are the Engineering Entrepreneurship Minor and the Villanova in the Valley program. We could not find a program that is specifically for supporting women entrepreneurship and offering funding. For mentorship activities on entrepreneurship, the leading program we could find was the Villanova Business School Mentor Program, which brings the students in this college and alumni together.

Tech Entrepreneurship and Mentorship Programs in Other Catholic Research Universities

	Women Tech Entrepreneurship	Women Entrepreneurship	Tech Entrepreneurship	Mentorship Activities
University of Notre Dame				
Georgetown University				*
Boston College				*
Fordham University				
The College of Holy Cross				
DePaul University		*		*

Table 1. Selected Catholic Research Universities and Their Programs On Women Tech Entrepreneurship, Women Entrepreneurship, Tech Entrepreneurship, and Mentorship

(* indicates the existence of a program).

The six Catholic research universities included in this study and their opportunities can be seen in Table 1. Upon broadly checking the programs offered to undergraduate students in these universities, we found that none of these universities have tech entrepreneurship programs.

DePaul University is the only Catholic research university investigated that has a program for women entrepreneurs. The Business Accelerator Program offered through their Women in Entrepreneurship Institute helps women founders bring their businesses to market or scale into new markets ("Business").

In three of the Catholic research universities studied, mentorship programs on entrepreneurship were identified. Interestingly, there is a great variety in types of mentoring preferred by these universities. Boston College offers a Women in Business Mentorship Program that connects first-year and upper-level students identifying as women ("WIB"). DePaul University has the Coleman Mentorship Program, where 50 mentors help students take their businesses to the next level ("Coleman"). Georgetown University has an Alumni Mentor Program, in which they connect people in different stages of their careers through the Georgetown experience ("Alumni").

Tech Entrepreneurship and Mentorship Programs in Universities in Close Proximity to Villanova University

	Women Tech Entrepreneurship	Women Entrepreneurship	Tech Entrepreneurship	Mentorship Activities
Miami University		*	*	*
LeHigh University			*	
University of Pennsylvania			*	*
Temple University		*		
Drexel University		*	*	*
Princeton University			*	*
University of Delaware			*	*
University of Maryland		*	*	*
University of Pittsburgh		*		*

Table 2. Universities Close to Villanova That Have Programs On Women Tech Entrepreneurship, Women Entrepreneurship, Tech Entrepreneurship, and Mentorship

(* indicates the existence of a program).

The remaining nine research universities included in this study due to their proximity to Villanova University and ABET accreditations can be seen in Table 2. Upon broadly checking the programs offered to undergraduate students in these universities, we found that none of these universities have tech entrepreneurship programs specifically for women.

Seven of these universities have programs on tech entrepreneurship, although none are women-specific. Lehigh University offers a Technical Entrepreneurship Capstone ("Technical") and an Integrated Business and Engineering Honors Program ("Integrated") and University of Pennsylvania has an Engineering Entrepreneurship Program ("Engineering Entrepreneurship"). Aside from such academic programs, we identified plenty of extracurricular programs that undergraduate students can participate in. University of Maryland's Mtech Ventures is an incubator for technology-based innovations commercialized at the university, helping early-stage startups survive the critical period in their development between conducting customer discovery and raising their first round of venture capital ("Mtech"). University of Delaware's The Blue Hen Proof of Concept program is, similarly, designed to provide gap funding and training during the initial technology commercialization activities ("Blue"). Drexel University's Botstiber Senior Design Entrepreneurship Competition ("Botstiber"), Ciright Dragon Startup Program ("Ciright"), and Vertex Innovation Fellows Program ("Vertex") all contribute to improving tech entrepreneurship across campus. Miami University's collaboration with CincyTech ("Institute") and their participation in the Silicon Valley Bank Trek program ("Prestigious") are some of their prominent opportunities for tech entrepreneurs.

The M&T Innovation Fund offered by University of Pennsylvania ("M&T") is the only student-run seed funding program for tech entrepreneurship that we could find. Managed by the students in the Jerome Fisher Management and Technology program, it provides a learning environment for both students managing the fund and the students receiving it.

Five of these universities have programs specifically designed for women entrepreneurs, and among these programs, Temple University's Lori Hermelin Bush Seed Fund ("The Lori") is particularly interesting. This fund supports ideas and models that advance women entrepreneurship and provides seed funding based on defined needs and the stage of the business venture. Among these five universities, four of them have accelerator programs, while two of them lead Women Entrepreneurship Week activities.

We also identified that seven of these nine universities have mentorship programs on entrepreneurship. With their various programs, University of Pennsylvania and Drexel University focus on mentorship the most. University of Pennsylvania's WHARTON Guide program fosters meaningful

connections between upperclassmen undergraduates and MBA students ("Wharton"), their Wharton Cohort Mentorship Program ("Wharton") connects incoming first-year students with upperclassmen mentors, and their Sophomore Experience Alumni Networking Reception program connects students with alumni mentors ("Alumni-Student"). Drexel University's StartupTree Mentor Match is a university-wide database of experienced entrepreneurs and industry experts, and their MentorHub program also connects entrepreneurship experts with students ("The Mentor"). However, we could not find mentorship opportunities specifically for women in any of these nine universities.

Villanova University's Engineering Entrepreneurship Minor

Villanova University's principal program for tech entrepreneurship is the Engineering Entrepreneurship Minor, which aims to equip engineers with an entrepreneurial mindset that will enable them to contribute to business success. The minor consists of 16 credits and focuses on creativity and innovation, new product ideation and development, and project funding and launching. The program is open to all students beginning in their sophomore year, and it is offered in the academic year and the summer as Engineering Entrepreneurship Summer Institute (E2SI) since 2019 ("Engineering Entrepreneurship Minor").

Year of Graduation	College of Engineering Students	School of Business Students	College of Liberal Arts and Sciences Students	Total
2011	16			16
2012	10			10
2013	16			16
2014	19			19
2015	19			19
2016	28			28
2017	25			25
2018	33			33
2019	17		1	18
2020	17	2	3	22
Grand Total	200	2	4	206

Table 3. Number of Engineering Entrepreneurship Minor graduates by colleges per year.

During 2011-2020, 206 undergraduate students graduated with a minor in Engineering Entrepreneurship. 199 of these graduates earned their minor within the academic year, while seven of them completed the E2SI program. All of the graduates who completed the minor within the academic year were from the College of Engineering. Only 1 of the 7 graduates who completed the E2SI program was from the College of Engineering, and the remaining 6 graduates were from the School of Business and the College of Liberal Arts and Sciences. Therefore, E2SI seems to better attract students from different colleges compared to the academic year program.

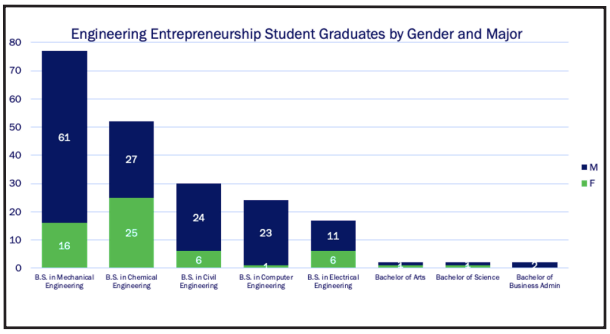

Chart 1. Engineering Entrepreneurship Graduates by Gender and Major.

The Engineering Entrepreneurship Program mainly sees participants majoring in Mechanical Engineering, Chemical Engineering, and Civil Engineering. Out of all the Engineering Entrepreneurship graduates from the College of Engineering, 38.5% studied Mechanical Engineering, 26% studied Chemical Engineering, and 15% studied Civil Engineering. So, the students from these majors make up approximately 80% of the participants from the College of Engineering. In terms of women representation in the program, Chemical Engineering has the highest contribution compared to the other Engineering majors, having a 48% female participant ratio, followed by Electrical Engineering, which has a 35% female participant ratio. It is interesting that out of 24 Computer Engineering students in the program, only one was female.

From Chart 2, it can be concluded that the interest in the program peaked in 2018, and it has been decreasing since. The drop in the number of Chemical Engineering and Mechanical Engineering students participating in the program after 2018 seems to be driving the downward trend.

To understand the reasons for the drop in the number of Chemical and Mechanical Engineering students in the program, we investigated the secondary minors of the participants. Since we only had the data on the engineering entrepreneurship minor students, we could not conduct analyses with the number of students in other minor programs. However, as can be seen in Chart 3, as Villanova University started

to offer minors in Mechatronics and Aerospace Engineering, some Mechanical Engineering students started to pursue these minors alongside Engineering Entrepreneurship. As Villanova started to offer minors in Biomedical Engineering, Biochemical Engineering, and Bioengineering, some Chemical Engineering students started to prefer these minors alongside Engineering Entrepreneurship. Therefore, we hypothesize that the downward trend in the program participation could be correlating with the offering of various new minor programs for engineering students, resulting in a lower interest from especially Mechanical and Chemical Engineering students.

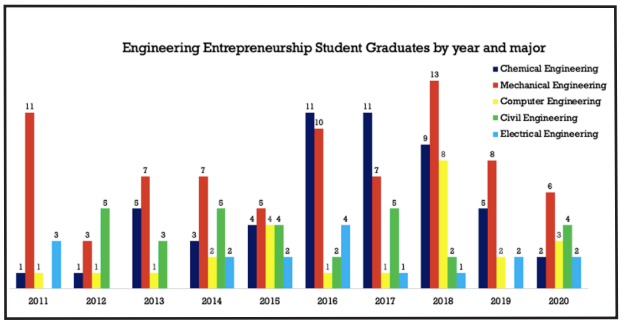

Chart 2. Engineering Entrepreneurship Graduates by year and major.

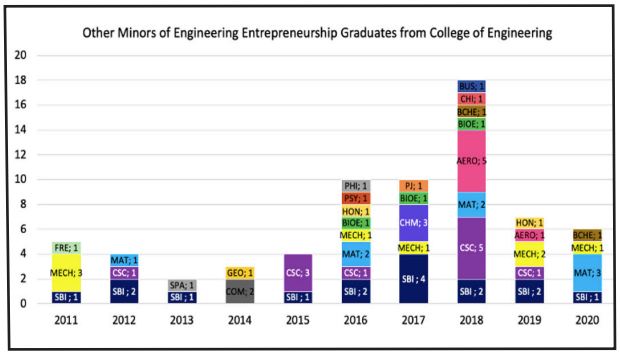

Chart 3. Secondary Majors of Engineering Entrepreneurship Graduates.

To eliminate the effects of the total number of students each major has on the interest in the program, the data can be normalized using the number of students in each engineering major in the Class of 2024. After this, it can be observed that there was significant interest in the program by the Computer Engineering students in 2018, although their interest seems to be decreasing.

Through a normalization that eliminates the impacts of female-male student ratios in the engineering majors, the female engineering students' interest in the program can be calculated to be 43.5% of the total engineer interest in the program.

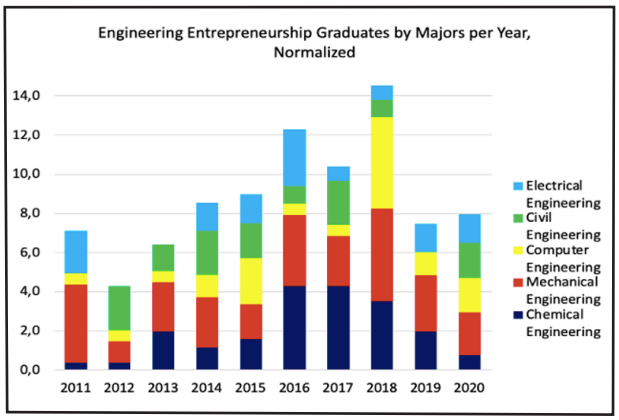

Chart 4. Engineering Entrepreneurship Graduates by year and major, normalized

Suggestions

- Villanova University has very strong Business and Engineering programs, and the intersection of these areas – tech entrepreneurship – should receive greater focus. By including more courses related to the alternative minors that the engineering students are driven to, the engineering entrepreneurship minor can gain more student interest.
- Since only one woman participated in the program from Computer Engineering out of 24 in total, the Engineering Entrepreneurship Minor can be promoted especially to women in Computer Engineering.
- Since the female engineer interest in the Engineering Entrepreneurship minor is only 43.5%, the minor could provide more gender-specific networking opportunities.
- Villanova University should implement student-led seed funding programs to improve women tech entrepreneurship.
- Although there exists a mentorship program for Business students, a broader women-specific entrepreneurship mentorship program could help the university increase the interest in tech entrepreneurship. Expert entrepreneurs, alumni, upper-level students, and first year students could be connected through a database. With various types of mentorship activities offered, the students and alumni could receive the best advice that they are looking for, and women can empower women.
- There should be more incubator programs to provide gap funding and training during the initial technology commercialization activities.
- The University should collaborate with technology firms to provide more internship opportunities on tech entrepreneurship to students.

Conclusion

In conclusion, at the undergraduate level, there appears to be a lack of women-specific tech entrepreneurship opportunities. None of the 15 universities studied have women-specific tech entrepreneurship programs. The six Catholic research universities studied do not have any tech entrepreneurship programs, one has a program on women entrepreneurship, and three have mentorship programs on entrepreneurship. Seven of the nine remaining universities have programs on tech entrepreneurship, five have programs on women entrepreneurship, and seven have mentorship programs on entrepreneurship. To close the gender gap in tech entrepreneurship, it is essential to create more women-specific programs and mentorship opportunities at the undergraduate level.

Villanova University's Engineering Entrepreneurship minor has recently gained more students from different colleges within the university through the E2SI program, and it has the highest participation from Mechanical Engineering and Chemical Engineering majors. After a peak in 2018, the interest in the minor program dropped, as the Mechanical Engineering and Chemical Engineering students started to show interest in new minor programs. The percentage of female students participating in the program from each major is less than or equal to 50%. There is a notable gender gap in the number of participants majoring in Computer Engineering, even when the female to male ratio in the major is accounted for. Overall, the normalized female engineering students' interest in the program is 43.5%, showing the room for improvement.

To increase these percentages and support undergraduate women tech entrepreneurs, Villanova University should offer gender-specific mentorship programs through a database that connects first-year students, upperclassmen, alumni, and expert entrepreneurs. Women-specific entrepreneurship programs should be designed, and student-led seed funding opportunities on women tech entrepreneurship should be created. With such efforts, Villanova can better support women in overcoming perceptual and social barriers, lead them to realize their true potential, and keep igniting change.

Next Steps

- Since the 43.5% reported is close to 50%, a statistical significance test could be done to see if the female interest in the program is significantly low.
- The paper specifically focuses on Engineering students, since out of the 206 students who pursued this minor, only six of them were outside of the College of Engineering. Once there are more students from different majors outside of Engineering, more research could be done regarding them, and additional suggestions could be made accordingly.
- Further research could be done on Villanova alumni who pursued the engineering entrepreneurship minor to see how many of them are working in tech entrepreneurship, and the impacts of the minor in their careers.

ACKNOWLEDGEMENTS

The author would like to thank the Villanova College of Engineering for providing datasets on the engineering entrepreneurship minor.

FUNDING

This research was supported by a Spring 2021 Villanova Match Research Program grant to Bilge D. Kocak.

REFERENCES

1. "Alumni Mentor Program." *Get Involved | McDonough School of Business*, Georgetown University, msb.georgetown.edu/alumni/get-involved/.
2. "Alumni-Student Engagement Opportunities." *Wharton School of Business*, University of Pennsylvania, 21 July 2020, undergrad-inside.wharton.upenn.edu/alumni/.
3. "Blue Hen Proof of Concept." *Horn Entrepreneurship*, University of Delaware, www.udel.edu/research-innovation/horn/venture-support/blue-hen-poc/#:~:text=The%20Blue%20Hen%20Proof%20of,researchers%20and%20inventors%20across%20campus.
4. "Botstiber Senior Design Entrepreneurship Competition." *Baiada Institute*, Drexel University, drexel.edu/baiada/competitions/botstiber-competition/#:~:text=The%20purpose%20of%20the%20competition,enhance%20their%20design%20project%20development.
5. "Business Accelerator Program." *Women in Entrepreneurship Institute*, DePaul University, business.depaul.edu/about/centers-institutes/women-in-entrepreneurship-institute/Pages/Business-Accelerator-Program.aspx.
6. "Ciright Dragon Startup Competition." *Baiada Institute*, Drexel University, drexel.edu/baiada/competitions/ciright-dragon-startup-competition/.
7. "Coleman Mentorship Program." *Coleman Entrepreneurship Center*, DePaul University, business.depaul.edu/about/centers-institutes/coleman-entrepreneurship-center/events-programs/Pages/mentorship-program.aspx.
8. "Engineering Entrepreneurship Minor." *College of Engineering*, Villanova University, www1.villanova.edu/content/university/engineering/academic-programs/undergraduate/minors/engineering-entrepreneurship.html.
9. "Engineering Entrepreneurship." *Penn Engineering*, University of Pennsylvania, eent.seas.upenn.edu/.

10. "Facts and Stats." *Data and Resources*, Women Who Tech, womenwhotech.com/data-and-resources#:~:text=Facts%20and%20Stats&text=Private%20technology%20companies%20led%20by,according%20to%20the%20Kauffman%20Foundation.
11. "Institute for Entrepreneurship, CincyTech Collaborate to Find Work for Students." *Farmer School of Business*, Miami University, www.miamioh.edu/fsb/news/2020/04/entrepreneurship-cincytech-collaborate-to-find-work-for-students.html.
12. "Integrated Business & Engineering." Lehigh University, ibe.lehigh.edu/.
13. "M&T Innovation Fund." *Jerome Fisher M&T Innovation Fund*, University of Pennsylvania, mtinnovationfund.com/.
14. "Mtech Ventures." *Maryland Technology Enterprise Institute*, University of Maryland, mtech.umd.edu/ventures/.
15. Prestigious SVB Trek Again Chooses FSB Student." *News - Farmer School of Business*, Miami University, miamioh.edu/fsb/fsbnews/?up=%2Fnews%2F181011120243+Prestigious+SVP+Trek+again+chooses+FSB+entrepreneurship+student&arc=current%3B.
16. "Technical Entrepreneurship Program." Lehigh University, catalog.lehigh.edu/coursesprogramsandcurricula/interdisciplinaryundergraduatestudy/technicalentrepreneurshipprogram/.
17. "The Lori Hermelin Bush Seed Fund." *Fox School of Business*, Temple University, 2 June 2021, www.fox.temple.edu/institutes-centers/innovation-entrepreneurship-institute/competitions/the-lori-hermelin-bush-seed-fund/.
18. "The Mentor Hub Program." *Baiada Institute for Entrepreneurship*, Drexel University, drexel.edu/baiada/mentorship/mentor-hub/.
19. "Vertex Innovation Program." *Charles D. Close School of Entrepreneurship*, Drexel University, drexel.edu/close/programs/vertex-innovation/.
20. "Wharton Mentorship Opportunities." *Wharton School of Business*, University of Pennsylvania, 4 Mar. 2021, undergrad-inside.wharton.upenn.edu/mentorship/.
21. "WIB Mentorship Program." *Women in Business*, Boston College, www.bcwib.com/wib-mentorship-program.
22. *All In: Women in the VC Ecosystem.* Pitchbook, 2019. Print.
23. Bittner, Ashley, and Brigette Lau. "Women-Led Startups Received Just 2.3% of VC Funding in 2020." *Harvard Business Review*, 25 Feb. 2021, hbr.org/2021/02/women-led-startups-received-just-2-3-of-vc-funding-in-2020.
24. Hanna, Roy, and Shalini Unnikrishnan. "The Trillion-Dollar Opportunity in Supporting Female Entrepreneurs." October 2019.
25. Laukhuf, Robin L., and Timothy A. Malone. "Women Entrepreneurs Need Mentors." *International Journal of Evidence Based Coaching and Mentoring*, vol. 13, Feb. 2015, pp. 70–86.
26. Morton, Christina & Huang-Saad, Aileen & Libarkin, Julie. (2016). Entrepreneurship Education for Women in Engineering: A Systematic Review of Entrepreneurship Assessment Literature with a Focus on Gender. 10.18260/p.26725.
27. Unnikrishnan, Shalini, and Cherie Blair. "Want to Boost the Global Economy by $5 Trillion? Support Women as Entrepreneurs." *BCG Global*, Boston Consulting Group, 8 Jan. 2021, www.bcg.com/publications/2019/boost-global-economy-5-trillion-dollar-support-women-entrepreneurs.
28. Williams, N. (2011, October 25). Infographics: Women and mentoring in the U.S. Retrieved from http://blog.linkedin.com/2011/10/25/mentoring-women/.
29. Xu, Shawn. "How Students Are Founding, Funding and Joining Startups." *TechCrunch*, 6 Feb. 2019, techcrunch.com/2019/02/06/how-students-are-founding-funding-and-joining-startups/.

Author

Bilge Deniz Kocak

Bilge Deniz Kocak is a sophomore Presidential Scholar from Turkey, and she is double majoring in Computer Science and Statistics. She wants to pursue Software Engineering and Data Science, and she is passionate about coding and research projects that aim to solve real-world problems, such as gender equity. She is the co-founder of the Villanova Girls Who Code College Loop, where she aims to improve mentorship activities and startup motivation at Villanova. Thanks to the MATCH Research Program, College of Engineering, and Prof. Lauri Olivier, she was able to research closing the gender gap in tech entrepreneurship during undergraduate education.

Mentor

Dr. Lauri Olivier

My career began as a research scientist, shifted to a product development manager, then moved into innovation management. I have extensive experience in tech-based entrepreneurialism and company start-up. I was the Director of a seed fund accelerator to spin companies out of regional universities, receiving and managing multiple SBIRs. While at Northwestern University I ran a program that commercialized a neural diagnostic, from bench to bedside, including product and market development, regulatory approval, and reimbursement. As a Senior Engineer at Raytheon, I led development of multiple technologies out of the ATP, or Advanced Technologies Program, for educational and military clients. I have started and managed my own innovation consulting firm, have spun out several companies from universities, including a $95 Million acquisition of a medical technologies company, have worked in community service to start up a Montessori School and sat on the Board of a high-tech alternative energy start up. I understand investment pitching, having interned at a venture company. I also have experience in financial modeling, pro forma development, primary and secondary market research, and corporate governance. From my career and as well from my MBA I have materials and tools that address innovation management, intellectual property development, customer and competitive analysis, technology development, the FDA regulatory process, clinical trials, marketing, and distribution. After 15 years spinning companies out of universities, I moved to university education. In this role I have transformed two entrepreneurship programs and developed robust entrepreneurial ecosystems for undergraduate and graduate students. My students have competed successfully in regional competitions and have started up ventures in NSF I-Corp programs at regional incubators.