# SECRET KEYS TO A STEM DEGREE

## The Wisdom I Wish I Had While Pursuing an Engineering Degree

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# Keys to a STEM Degree

# Resources for This Presentation

**Justin's Website:** JustinRittenhousePhD.com

- Contact me with any questions
- Sign up for my mailing list to stay up to date

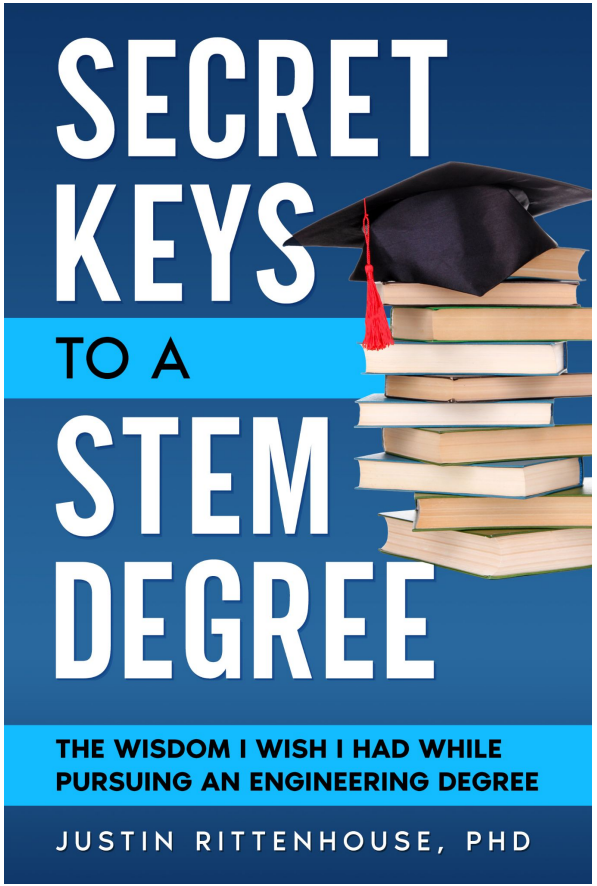
**Justin's LinkedIn:** linkedin.com/in/justin-rittenhouse-phd

- Connect with me on LinkedIn
- Explore my background, experience, and work

**Links to My Book:**

Amazon

Barnes & Noble



# Everyone Struggles More Than You Think

**About 70% of people experience impostor syndrome at some point in their lives.**[1]

**You are not alone**

- Everyone has strengths and struggles
- Experience helps, but doubt never fully disappears
- Even now, I still have doubts

**A life with no risk leads to poverty – financially, emotionally, and spiritually.**

**Stop**

- Talking yourself out of success
- Letting others talk you out of success
- Making excuses
- Choosing the easy way out
- Letting fear control your life

**Start**

- Doing
- Trying
- Failing
- Trying again

*“Someone’s opinion of you does not have to become your reality.”*

*- Les Brown*

# Chapter 1: Introduction

**Background**

- I was not an outstanding high school student
- I knew I couldn't stock groceries forever

**Why this book exists**

- To support current and future STEM majors
  - For high school, college, and non-traditional students

**Key message for this chapter**

- There is no timeline on a degree
  - No one checks how long it took
  - No one knows your full story or the challenges you faced

**Industry experience**

- **Whirlpool** (Fortune 500) — Engineering Analyst
- **J. Rettenmaier USA** — Process Engineer
- **Glassmaster Controls** — Engineering Manager; Project Design Engineer
- **Denso** (Fortune 500) — Intern (Quality & R&D); Co-op (Test Lab)

**Academic experience**

- **WMU** — Part-Time Instructor
- **MVNU** — Assistant Professor, Mechanical Engineering
- **WMU** — Graduate Research & Teaching Assistant

**Education**

- **PhD** — Mechanical Engineering, WMU
- **MS** — Aerospace Engineering, WMU
- **BS** — Aerospace Engineering, WMU

# Chapter 2: Is College Right for You?

**Why you should go to college**

- STEM careers can be fun and rewarding
- STEM majors have robust job markets
- Nearly a third of jobs that once required only a high school diploma now require a four-year degree[2]
- 88% of millionaires graduated from college[3]

**What people say:**

"I have a degree, but it was a waste of money because I don't use it."

**What they actually mean:**

"My career is not in the area of my major."

**Why you shouldn't go to college**

- Avoid unnecessary college debt
- Pursue your own passions and ideas
- Skilled trades are a strong alternative
  - Especially if your goal is a high income

**Remember**

- There is no fixed timeline for college
  - Colleges have existed for hundreds of years
  - Starting at 20 instead of 18 does not derail your life

Can college be free?

Yes

No

# Chapter 3: Methods to Minimize Educational Costs

**Why minimize?**

One in eleven suicides of young professionals is related to student loans.[4]

**Apply for many scholarships**

- Not limited to “smart” students
- Small scholarships add up
- Think about what makes you unique

**Scholarship resources**

- Professors, professional societies, college websites, government websites, etc.

**Additional ways to save**

- Utilize community colleges
- Skip remedial and/or freshman-level classes
  - Talk to your advisor
  - ALEKS exams

**Open-source options can reduce software expenses**

- FreeCAD.org, Python.org, LibreOffice.org (or Google Workspace), etc.

How many times has a recruiter asked about my minor?

A) Frequently

B) A few times

C) Once

D) Never

# Chapter 4: Selecting a Major

**Not a life-or-death decision**

- A degree is a career tool
  - The right major strengthens that tool
- Only 27% of college graduates work in a career closely related to their major[5]

**Talk to industry professionals**

- Ask tough questions

**Build your network intentionally**

- Attend hiring and career events
  - Many are open to students

**Start working in your field early**

- Attend research summer camps
- Internships or co-ops

**Minors may have low ROI**

- Check if they boost your career prospects
- Don't overthink it for ME or AE

**Mistakes happen:**

**learn, adjust, and move on**

What do employers value most when hiring new graduates?

A) GPA

B) Number of extracurricular activities

C) Real-world experience

D) Difficulty of courses taken

# Chapter 5: Why Gaining Experience Matters and How to Do It

**Experience matters**

- Many students focus only on grades
  - The goal of college is employment
- Real-world experience
  - Companies, like Blue Origin, avoid interns without prior internship experience

**Academic opportunities**

- Email professors about TA opportunities
  - If one says no, ask another
  - Keep emails concise and professional

**Pick class projects that align with your career goals**

**Clubs, associations, and professional societies**

- Can help you land your first internship
  - Example: Baja SAE
- Hands-on experience with industry-standard tools

**Tailor your resume to the job**

- Adjust it for each position
- Resume should be one page

**During the interview**

- Show examples of success
- Tie your answers to your experiences and skills
- There are no “magic words” in interviews

What is the main reason many new hires fail within the first 18 months?

Lack of technical skills

Lack of soft skills

# Chapter 6: Develop Your Soft Skills

**Your personality matters**

- Talent and credentials may land the interview
- Soft skills and personality land the job
  - They also influence your long-term career growth and promotions
- 48% of new hires fail within 18 months; 89% of these failures are due to soft skills[6]

**Top soft skills**

- Kindness
- Humility
- Positive outlook

**Build soft skills in college**

- Communication
- Teamwork (use “we,” not “I”)
- Presentation skills

**Time is a valuable asset; treat it that way**

- Avoid environments where you’re unproductive
  - No one has mastered watching TV while doing focused work
- Find a focus-friendly space
  - Use tools like music or pink noise to stay concentrated

*“One of the worst hiring mistakes that I’ve made in the past is looking too much at their intellectual capability alone and not on how they affect those around them. . . . And it really matters if they have a good heart and personality”*

*- Elon Musk*

# Chapter 7: The Importance of Writing Well

**I got called out**

- My advisor pushed me to improve early in grad school
  - His advisor told him the same
  - My peers had similar experiences

**Your writing is weaker than you think**

- Strong writing matters, even in STEM
- Writing improves with deliberate practice

**Technical writing tips**

- Maintain objectivity
  - Write from facts, not opinions
- Less is more; do not ramble
- Quantify your statements
  - Use numbers
- Do not misrepresent or manipulate data
- Use an appropriate vocabulary
- Edit, edit, and edit
- When able, receive feedback

Which statement best describes the use of computers in engineering?

A) Computers always give correct answers

B) Computers are useful, but results depend on assumptions and inputs

C) Computers are black boxes that engineers should simply trust

D) Computers remove the need for engineering judgment

# Chapter 8: Understanding Our Limitations

**My most important college lesson**

- Learning the limits of my own knowledge
  - It's cliché to say, "That person knows everything about X."
- The Dunning–Kruger effect is real
  - The more you learn, the more you realize how much you don't know

**Limitations of your approach**

- Understand the assumptions behind the equations and constants you use
  - In STEM, assumptions are often necessary due to real-world complexities

**Limitations of the tools you use**

- Computers are not magical black boxes; don't treat them as such
- When using numerical analysis tools, ask:
  - What governing equations are being used and why?
  - What assumptions are being made and why?

# Chapter 9: Improve Yourself

**Form good habits**

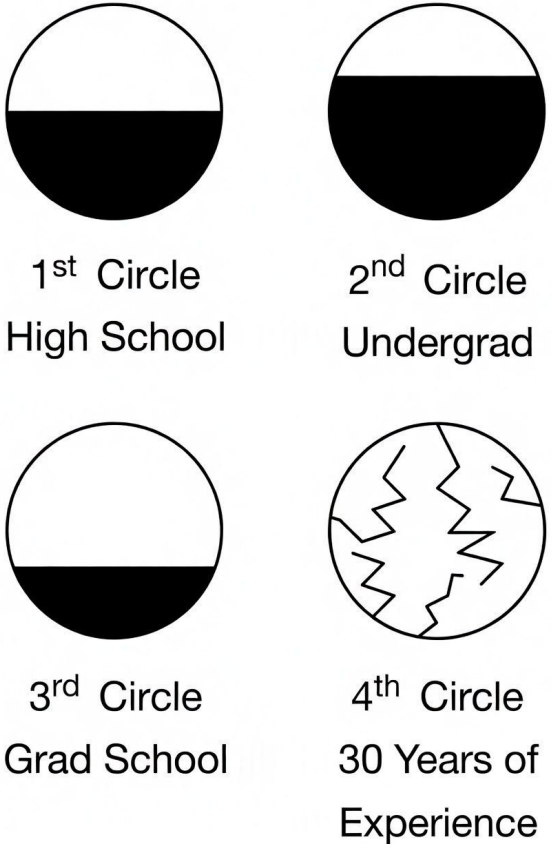
- Stable schedules improved sales by 7% and productivity by 5% in a study of Gap employees[7]

**Ask for help**

- Feedback from experienced people accelerates improvement

**Stop doubting yourself**

- You're human, just like everyone else
- A study comparing 329 aerospace engineers with 18,427 adults found no significant cognitive differences across several domains[8]



*“People don’t fail; they quit.”*

*– Unknown*

# Chapter 10: Reduce Stress

**Stop comparing yourself to others**

- Success cannot be measured by outcome alone
- Everyone's situation is different
  - Life circumstances matter (family, health, responsibilities, goals)

**Stop worrying about a bad grade**

- Most students perform poorly on an exam or two at some point
- High GPAs can help early in your career
  - Admission to college or graduate school
  - First job at a well-known company
- After a few years of experience, GPAs hold little weight

**Get 7–9 hours of sleep per night**

- A 2021 study found those sleeping ≤6 hours were ~2.5× more likely to experience frequent mental distress[9]
- More sleep led to 20% faster typing and 35% greater accuracy[10]

**Saying "No" is a time-management strategy**

*“Comparison is the thief of joy.”*

*– Theodore Roosevelt*

# Chapter 11: Additional Information

**Computer programming is easier than it appears**

- Like learning a sport, instrument, or other skill
- Start with a very small project
- Gradually build to slightly harder projects
- Use free online resources (e.g., YouTube) to learn

**Learn how to budget**

- Don’t spend every dollar you earn
- Budgeting is important in college and life

**Practice using spreadsheet programs during college**

**Opinion vs. Advice**

- Opinion → from someone without experience
- Advice → from someone with experience

**Build systems to help you succeed**

- Design systems that support your goals
- Example: Don’t buy unhealthy food for your home

**You are responsible for your successes and failures**

# Appendix: Resources

## Free tools for STEM students

### The author's website

- JustinRittenhousePhD.com

### Productivity/Homework

- WolframAlpha (wolframalpha.com)
- LibreOffice (libreoffice.org)

### Programming

- Anaconda (anaconda.com)
- Octave (gnu.org/software/octave)

### Compatibility

- WineHQ (winehq.org)

### CAD / Simulation

- FreeCAD (freecad.org)
- CalculiX (calculix.de)
- ParaView (paraview.org)

### Random

- OBS Studio (obsproject.com)
- VirtualBox (virtualbox.org)

# Conclusion

We covered a lot today
There is much more in the book

But if you remember only one thing…

You're human
Just like everyone else

No one is inherently more capable than you

**STOP DOUBTING YOURSELF**

# Thank You

**Thank you for your time and attention!**

- I truly appreciate everyone who takes the time to read my book or listen to this presentation
- If you found this useful and informative, please share it with friends, family, teachers, or students who may benefit
  - If you read the book, don't forget to leave an online review
- Questions?
  - Reach out via my website (JustinRittenhousePhD.com) or LinkedIn

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