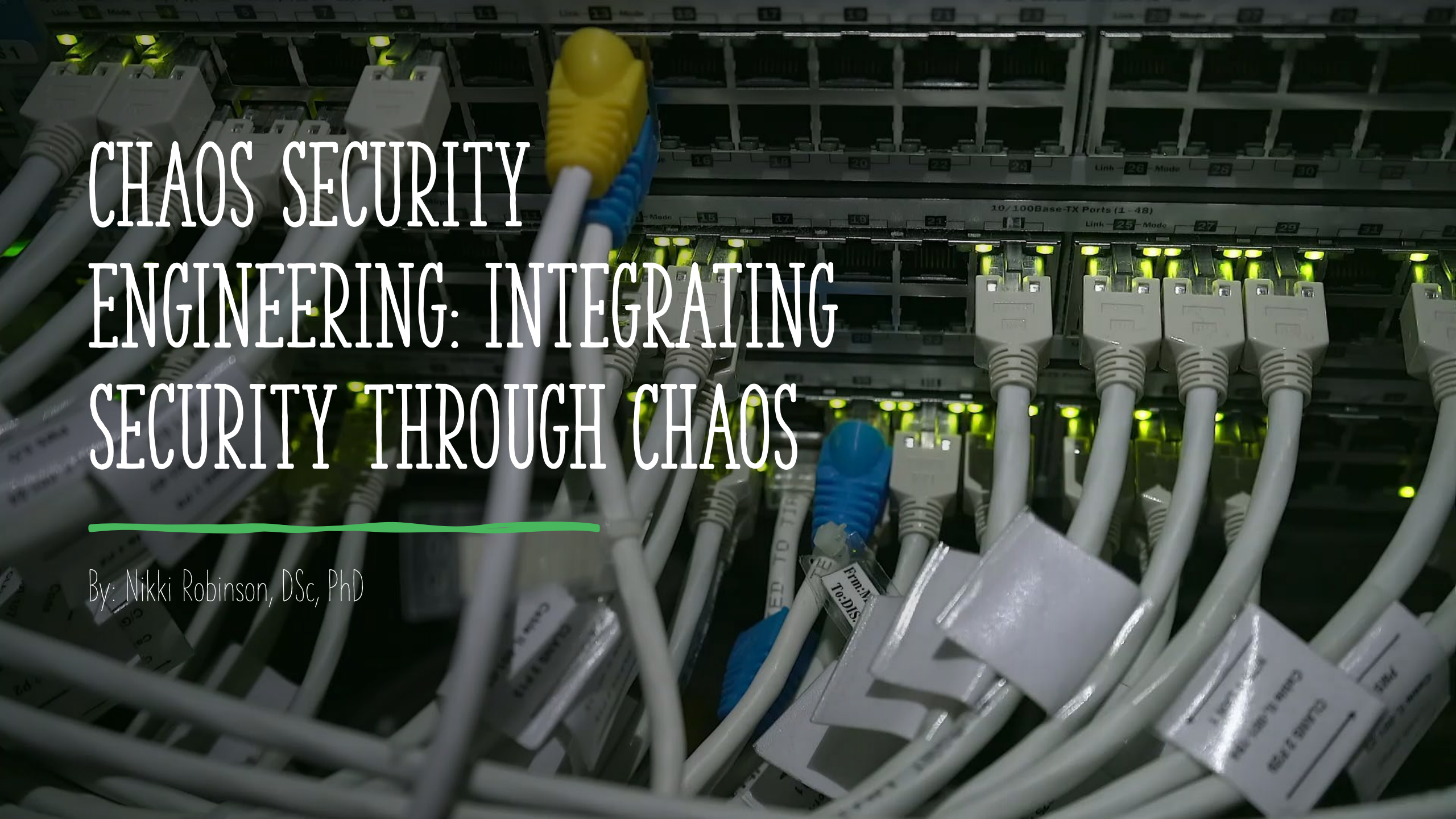


CHAOS SECURITY ENGINEERING: INTEGRATING SECURITY THROUGH CHAOS

By: Nikki Robinson, DSc, PhD

DISCLAIMER

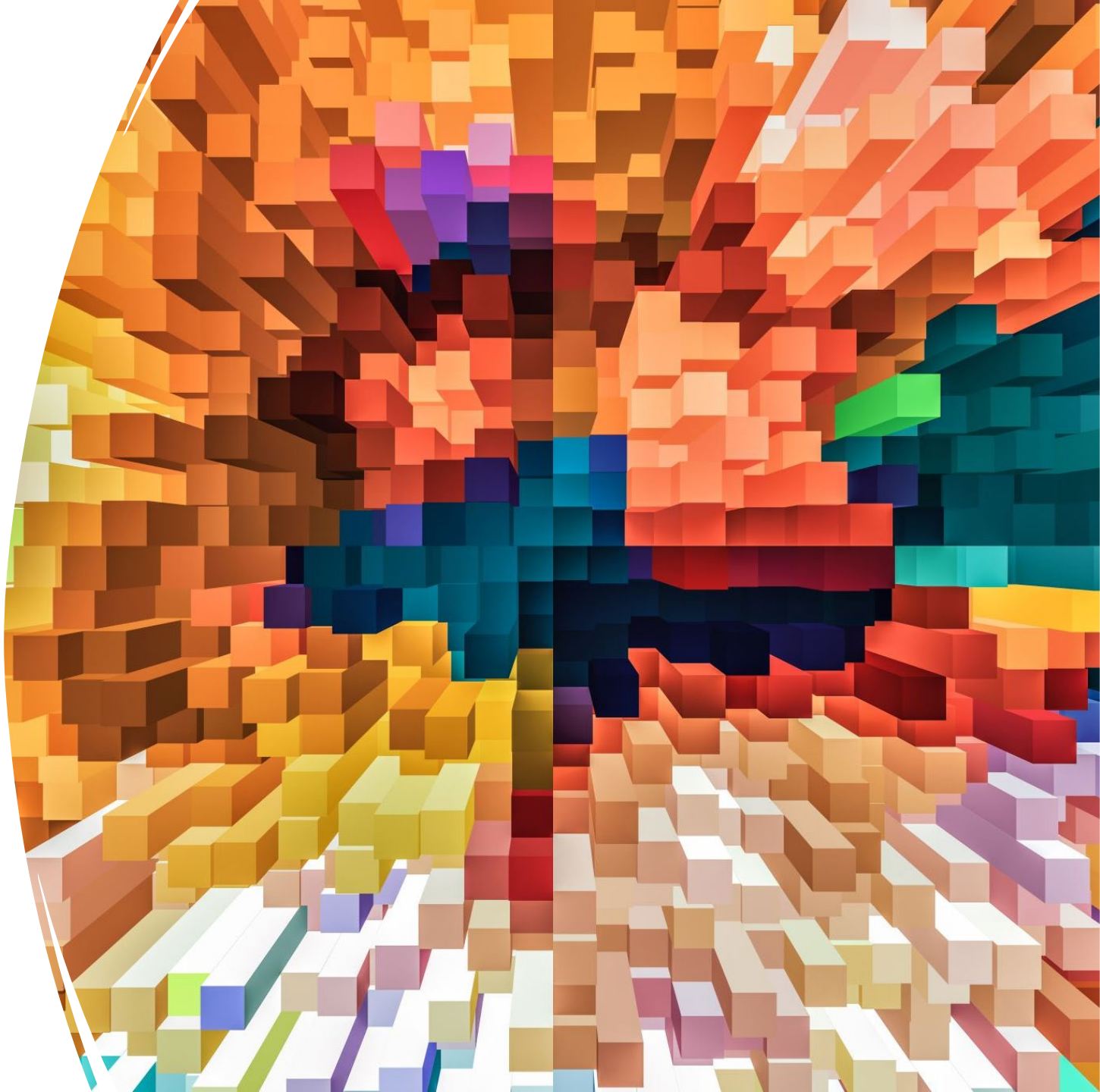
All thoughts, feelings, views expressed in this presentation are my own. They do not reflect my employer/s. All views or opinions expressed in this presentation are personal and belong solely to me. They do not reflect the people, institutions, or organizations that I may or may not be associated with in a professional / personal capacity. Any views or opinions are not intended to malign any person, place, or organization

INTRODUCTION

- Security Architect, IBM
- Adjunct Professor, Capitol Technology University
- ICIT Fellow (2022-2023)
- President, InfraGard Maryland
- Doctorate of Science (DSc), Cybersecurity
- PhD, Human Factors

AGENDA

- DevSecOps
- Chaos Engineering
- Chaos Security Engineering (CSE)
- Hypothesis-Based Testing
- Benefits of CSE
- Open-Source Information



DEVSECOPS

Integration of developers, security, operations

More than tools or process - but communication between teams

Security in Agile - continuous iteration

Security engineers working during design and development phases

CHAOS ENGINEERING

- Not actually based in chaotic functions or methods
- Hypothesis-based approach to testing, breaking, fixing
- Build research questions and hypotheses based on possible problems
- Identify misconfigurations before they become a major problem
- Similar to penetration test methodology – how can I break (into) this?

Reference: https://principlesofchaos.org/

CHAOS SECURITY ENGINEERING

Build a hypothesis / steady state behavior

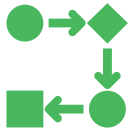
What security baselines exist? Are configurations similar across configurations?

Real-World Events

Threat intelligence data injected into code?

Experiments in Production

Authentication, encryption, security control expectation, passwords saved



Automate / Iterate

Integrate security testing / continuous monitoring

Reference: https://principlesofchaos.org/

HYPOTHESIS-BASED TESTING

Confirmation Bias - expectations vs reality

Environmental factors - cloud-based? Micro-application development?

Causation vs correlation

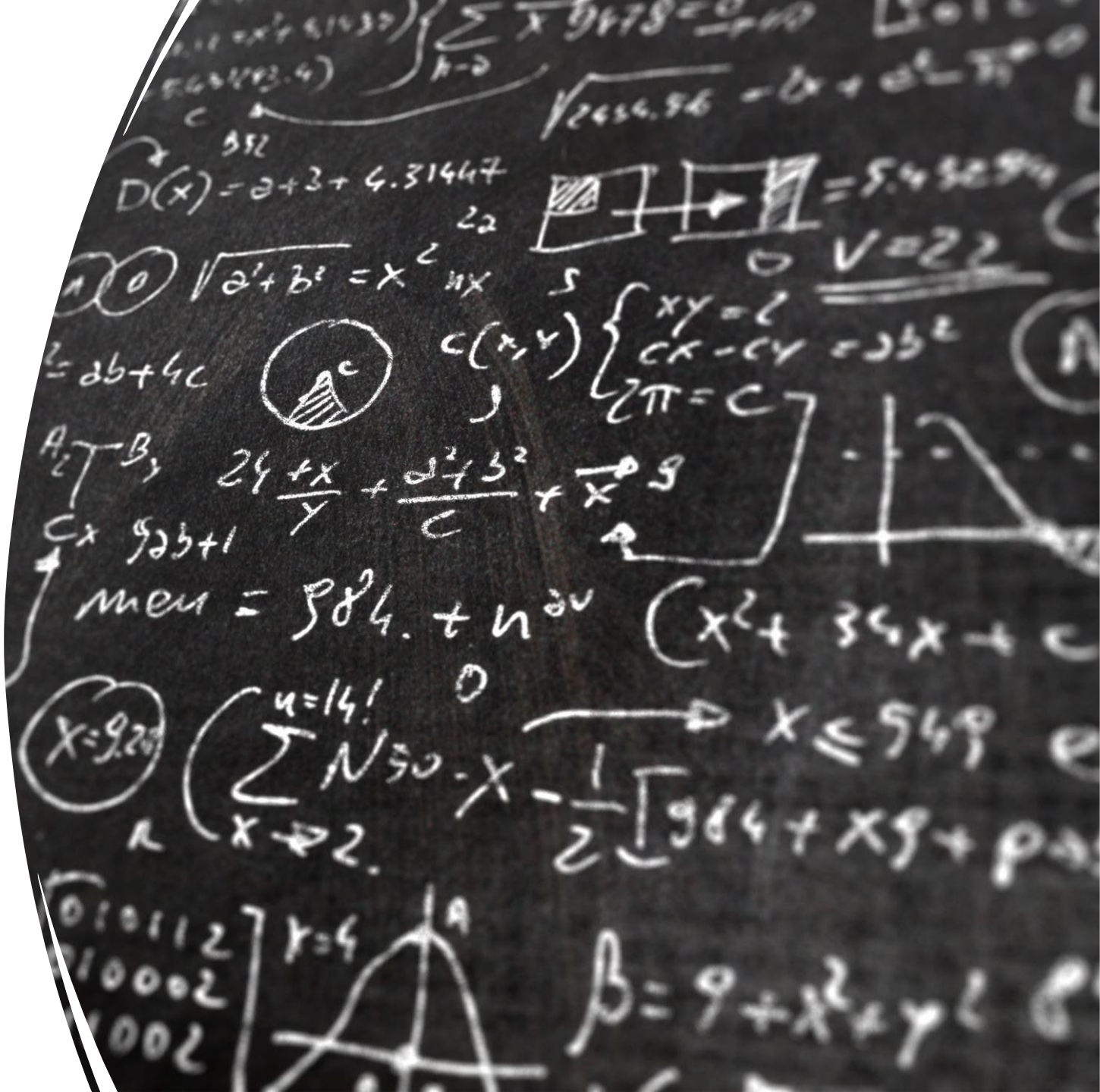
Identifying / defining variables

Anchoring and Accessibility

Reference: Blackwell Handbook of Judgement and Decision Making, Derek Koehler and Nigel Harvey (2004)

MATURING A DEVSECOPS PROGRAM

- What is the current / steady state of the program
- What skills / characteristics do your developers have?
- What is the ultimate goal of the project?
- Who do you need to hire? Who can be upskilled?
- Once program is in place - sprinkle in a little chaos



BENEFITS OF CHAOS SECURITY ENGINEERING (CSE)

- Integrate more security engineering skills/practitioners on the team
- Improve the reputation and usability of the product
- Security is not a point in time - able to measure the moving needle
- Reduce cost of security at the end of projects
- Don't rely just on tools and processes - use hypotheses
- Move to a predictive security model

VULNERABILITY CHAINING

Combination of vulnerabilities to create critical attacks

Consider low and medium vulnerabilities for hypothesis-based testing

Not just chaining vulnerabilities - it's about the methodology

What are the known-knowns and unknown-unknowns

Vulnerability Chaining Blindness (VCB)

Reference: http://xla.com/index.php/2021/01/07/vulnerability-chaining-considerations-across-enterprise/

OPEN-SOURCE INFORMATION

- Security Chaos Engineering (Rinehard, A, and Shortridge, K.)
  - https://www.oreilly.com/library/view/security-chaos-engineering/9781492080350/
- DevSecCon – Security Chaos Engineering - What is it and why should you care?
  - https://www.devseccon.com/the-secure-developer-podcast/ep-67-security-chaos-engineering-what-is-it-and-why-should-you-care
- Tools to conduct security chaos engineering tests
  - https://www.techtarget.com/searchsecurity/feature/Tools-to-conduct-security-chaos-engineering-tests
- ChaoSlingr
  - https://github.com/Optum/ChaoSlingr


QUESTIONS/THOUGHTS?