# Week 1: Developing an Idea

## What do you do with an idea?

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# Brainstorming session:
# What characterizes GREAT research?

# Types of scientists

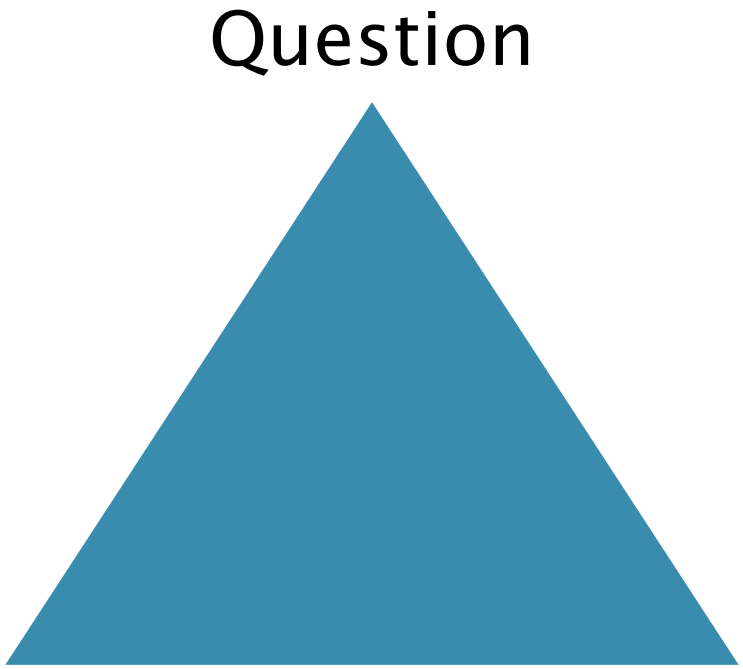
**Miner**

**Techniques**


**Farmer**

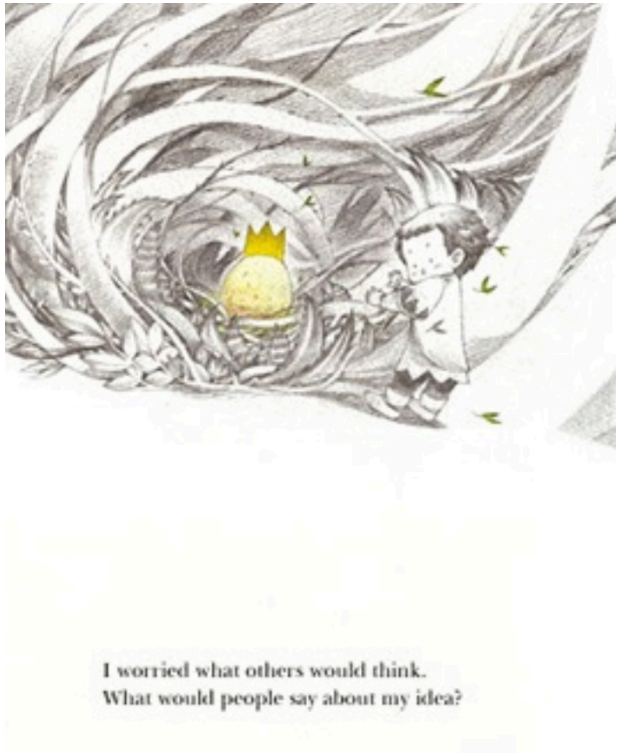
**Taxon**

# Three things to decide



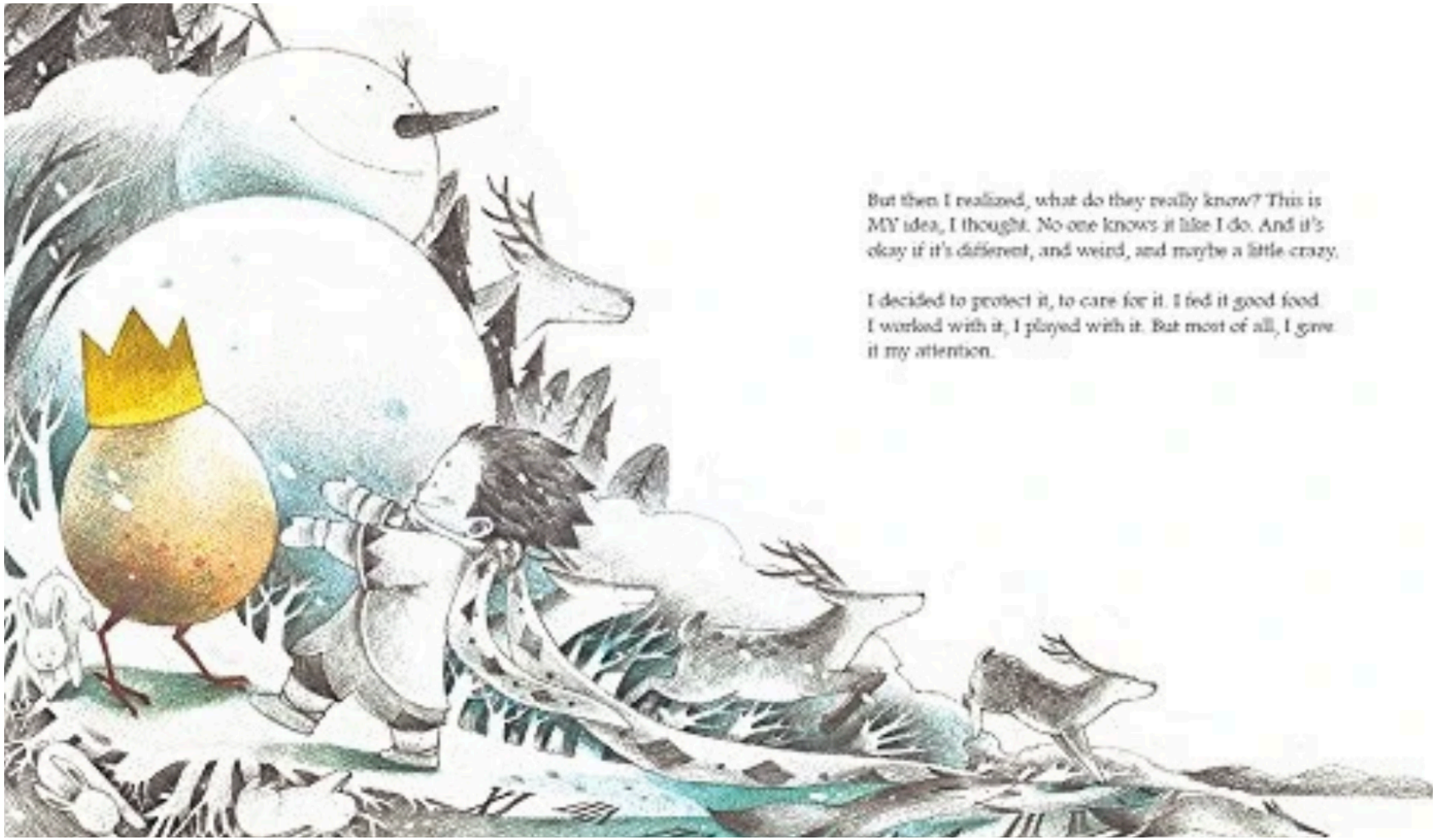

Choose one (or two), let the others emerge according to what makes the BEST science

# Getting feedback




**Sources of feedback:**

- PI / advisor
- Lab members
- Other grad students
- Committee members
- Other faculty mentors



But then I realized, what do they really know? This is MY idea, I thought. No one knows it like I do. And it's okay if it's different, and weird, and maybe a little crazy.

I decided to protect it, to care for it. I fed it good food. I worked with it, I played with it. But most of all, I gave it my attention.

# How do you develop an idea?

- Read, write, read
- Daily writing habit (>30 min day)
- Write: annotated bibliographies, brainstorming sessions (hand-write?), mind-maps, annotate PDFs, bullet point lists, rough notes, terrible first drats, edited drafts (and repeat!), final product!
- Pomodoros: pebbles (15 min), rocks (30 min), boulders (1 h) (NCFDD)

# This week's assignment:

- Write a "Hook" paragraph – 1 paragraph description of your proposed research topic, designed to "hook" your reader's interest (due Thursday 09/03)
- Something you are passionate about
- Characteristics of GREAT science – why is it important, what is the gap or need, how will the world be better?
- Don't overthink it, just write! You will develop the ideas further as the semester goes on

# Great “hooks”

Toxins are surprisingly common components of ecosystems around the world and have played a central role in the development of evolution as a field. Because toxins can cause disorientation, vomiting, paralysis, or even death, they are potent agents of natural selection. As a result, many animals have co-opted toxins in their own defense, and in the process, evolved toxin resistance (i.e., insensitivity). Some animals even sequester toxins from their diet or environment, a phenotype known as an acquired chemical defense. However, there is a gap in our understanding of the evolution of acquired defenses.

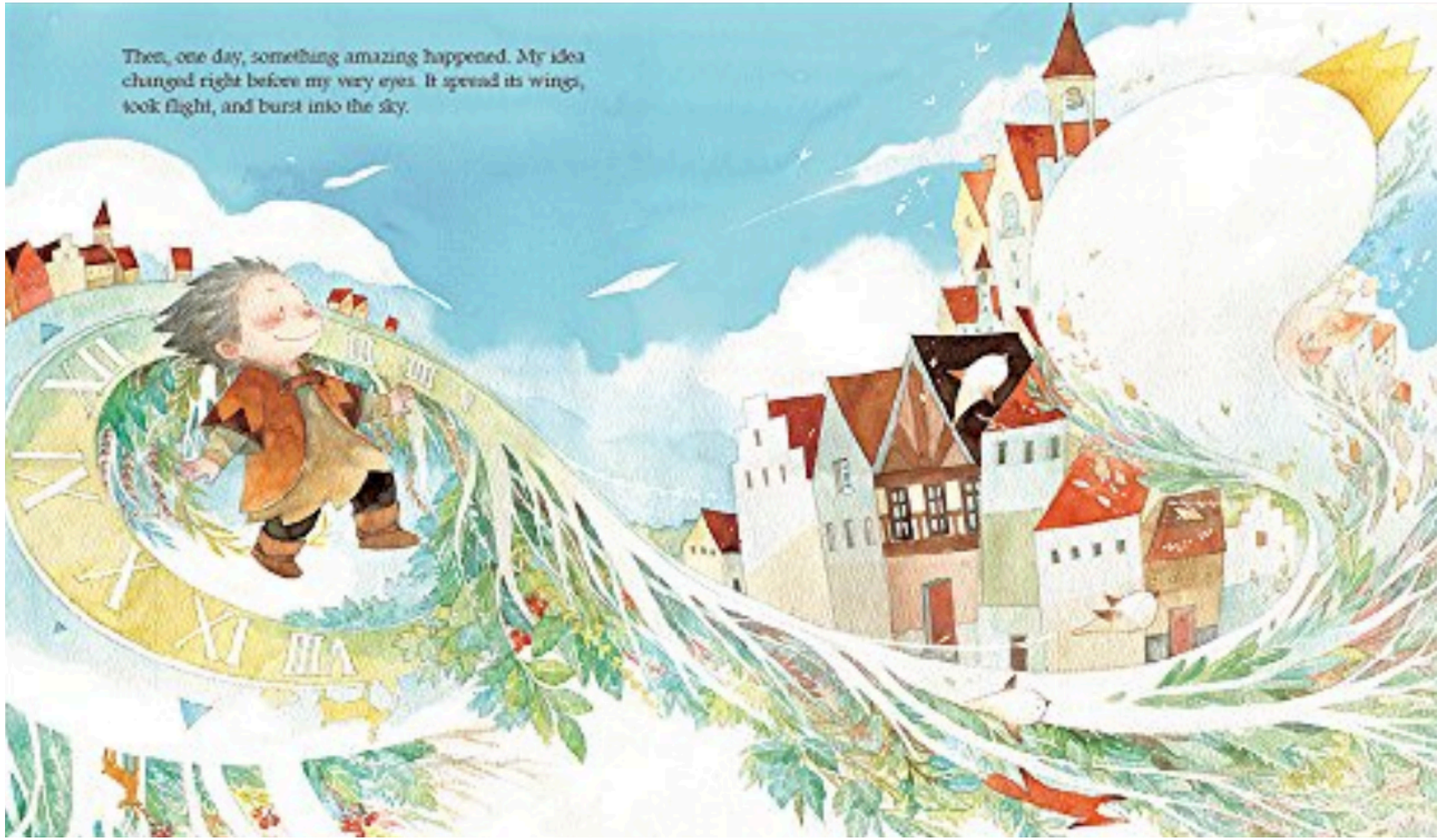
Prof. Tarvin, CAREER proposal

# Great “hooks”

Over 600 million years ago, the first multicellular animals evolved from their single-celled ancestors, setting in motion all subsequent animal evolution (Schopf & Klein 1992; Knoll & Lipps 1993; Armstrong & Brasier 2005). Recent comparative genomic and molecular phylogenetic analyses reveal a close relationship between animals and choanoflagellate protozoans (e.g. King & Carroll 2001; King et al. 2003; King 2004; Steenkamp et al. 2006; Carr et al. 2008; King et al. 2008). King developed use of the chonaoflagellate Salpingoeca rosetta, which can be unicellular and can form multicellular colonies, as a model system to study the evolution of animal multicellularity. For multicellularity to evolve, there must have been a selective advantage to being colonial, but since both unicellular and colonial choanoflagellates still exist today, there may be different environmental conditions under which unicellular or multicellular forms perform better.

Prof.s Koehl and King, NSF grant




"And then, I realized what you do with an idea. You change the world!"