

August 2, 2022

# Announcements

August 11 (Thu)

**Date change!**

9 am: Graduate School "Tips and Tricks" with Kyle Shea (UW Neuroscience Graduate Program Advisor).

August 5-7 (Fri-Sun)

Seafair Weekend



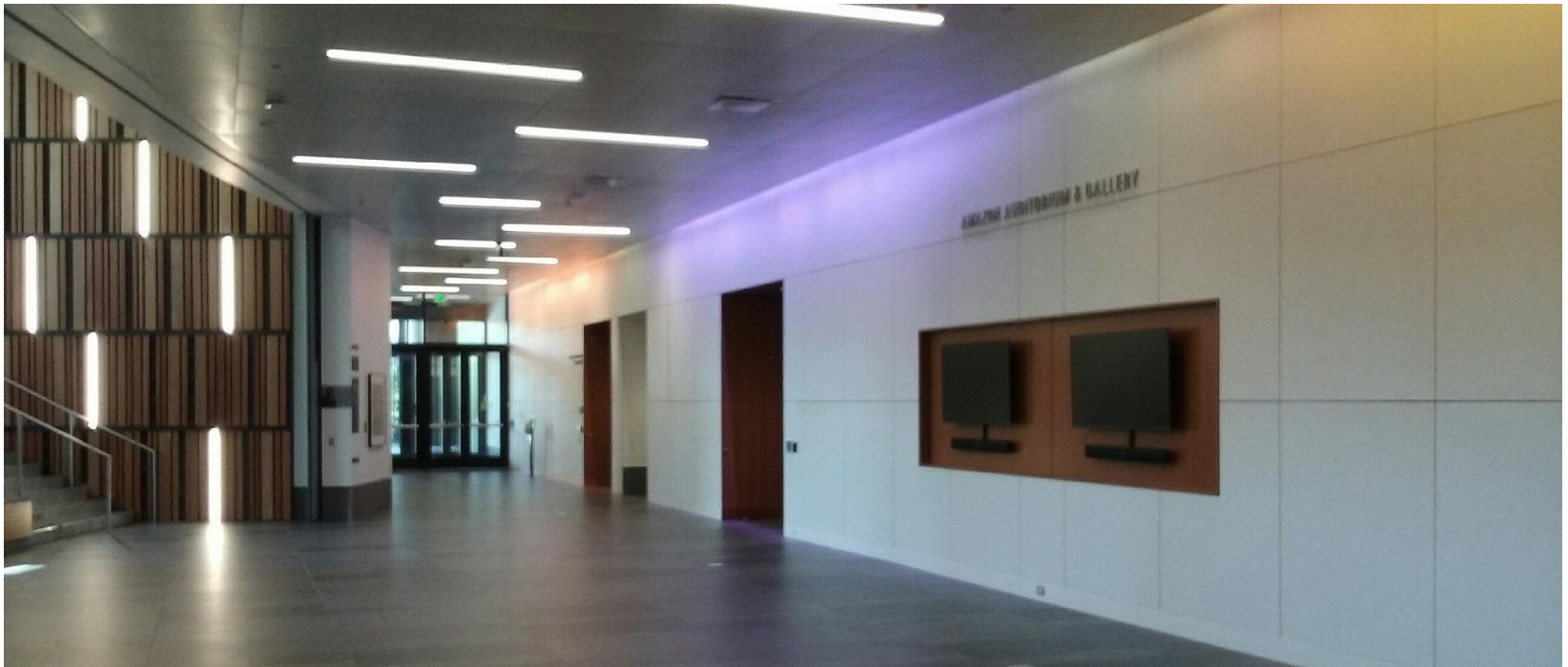
# Announcements

August 4 (Thursday): Presentation rough drafts due

August 10 (Wednesday): Final Abstracts/Posters due (noon)

August 15 (Monday): Final Slides due (noon)

August 17 (Wednesday): Research Symposium  
Talks: 8:30 am -12:00 pm  
Posters: 1:00 pm - 3:00 pm



# Review

- Scientific Writing; Reference Managers
- Figures for Publication
- Scientific Posters
- Speaking – Scientific/Public Audiences

# Communicating Science to the Public

- Friends and family
- Resumes and job interviews
- Grant applications and reviews
- Media
- Inspire, educate, mentor
- Encourage people to volunteer for research studies
- Informed public

Why?

When?

How?

# Public Speaking: You be the Judge

When watching other speakers, “score” them on the content and delivery of their presentations.

Pay attention to:

- Logical, fluid transitions and organization
- Stories/examples to engage audience
- Jargon
- Umms and Ahs
- Speed/Tone of voice
- Eye Contact / Movement
- Visuals
- Use of pointer



# How to write an effective abstract

# What is an abstract and why is it important?

- An abstract is a brief summary of a research article, thesis, review, conference proceeding, or any in-depth analysis of a particular subject and is often used to help the reader quickly ascertain the paper's purpose. (Wikipedia: Abstract(summary))
- Possibly the only, part of your paper that anyone will read (other than the title).

# Parts of an Abstract

- All the same components as the paper
  - Background
  - Methods
  - Results
  - Conclusions
- All in ~150-350 words
- Specific format depends on the meeting or journal.



# Your Abstract

- Your abstract should be **300 words or less**  
(the 300 words does not include the title, authors or affiliations)
- Please format using this style:

**Title Goes Here (Use uppercase for first letter of each word.)**  
**Authors (First Name Last Name), superscripted affiliation numbers**  
**Superscripted affiliation #, Affiliation, City, State**  
**Superscripted affiliation #, Affiliation, City, State**  
Text (~300 words) follows and is not bolded.

Font style: **Times New Roman**  
Font size: **11 pt., Bold**  
Line spacing: **single**

## Example

**Characterizing Reward Seeking Activity and Neural Activity in the Mesolimbic Dopamine System**  
**Bre Surface<sup>1</sup>, Daniel Elum<sup>2</sup>, Ellen Weifel<sup>2</sup>**  
**<sup>1</sup>Department of Bioengineering, University of Oregon, Eugene, OR**  
**<sup>2</sup>Department of Pharmacology, University of Washington, Seattle, WA**

Font style: **Times New Roman**  
Font size: **11 pt., Bold**  
Line spacing: **single**

How does behavior in mice change across multiple phases of reward-seeking behavior and what is the role of neural activity in the mesolimbic dopamine system during behavior? To examine this, mice were trained on a 12-day behavioral paradigm including cue-induced reinstatement and a progressive ratio task. The first five days consist of an acquisition phase in which mice learn to associate a lever press (action) and audiovisual cue with a natural food reward. Following acquisition, the cue and reward outcomes are omitted following lever pressing. During acquisition, mice increase their lever pressing throughout learning and decrease their lever pressing during extinction learning. Additionally, our data shows significant natural variability in lever pressing behavior during each phase of the cue-induced reinstatement and breakpoint level on the progressive ratio task. Additionally, neural activity in mesolimbic dopamine neurons is increased during action, cue, and reward behavioral epochs. Together, our data provide insight into how the mesolimbic dopamine system regulates motivated behavior.

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Do not indent the margin.

Your Abstract:

Send to me ([chudler@uw.edu](mailto:chudler@uw.edu)) in a WORD (.doc or .docx file) by noon on August 10.

**Characterizing Reward Seeking Activity and Neural Activity in the Mesolimbic Dopamine System**

**Bree Surface<sup>1</sup>, Daniel Elum<sup>2</sup>, Ellen Weifel<sup>2</sup>**

**<sup>1</sup>Department of Bioengineering, University of Oregon, Eugene, OR**

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# How long is 300 words?

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**300 words = ~15-20 sentences.**

# Your Abstract (exceptions)

Q: Can I use my middle name or middle initial?

A: Yes. Example: **Bree H. Surface<sup>1</sup>, Daniel T. Elum<sup>2</sup>, Ellen Weifel<sup>2</sup>**

Q: What if I do not have a departmental affiliation?

A: Then use your college/university only.

Q: What if I or my mentors/PI have more than one affiliation? (Ask your mentor.)

A: Then assign additional superscripted affiliation # and add another affiliation line(s). Example:

**Bree Surface<sup>1,2</sup>, Daniel Elum<sup>2,3</sup>, Ellen Weifel<sup>2,4</sup>**

**<sup>1</sup>Department of Bioengineering, University of Oregon, Eugene, OR**

**<sup>2</sup>Department of Pharmacology, University of Washington, Seattle, WA**

**<sup>3</sup>Department of Psychology, University of Washington, Seattle, WA**

**<sup>4</sup>Department of Computer Science and Engineering, Yale University, New Haven, CT**

Q: What if my abstract is more than 300 words?

A: Revise it; reduce the number of words to get you to 300 words or less.

Q: What is the minimum numbers of words I can use in the abstract?

A: There is no minimum, but your abstract should have enough information to express your work.

# Characteristics of a good abstract

- Precise language
- Minimum sufficient background information
- Sufficient methods
- Specific findings
- Supported conclusions

# Six sentences to start

(<http://www.easterbrook.ca/steve/2010/01/how-to-write-a-scientific-abstract-in-six-easy-steps/>)

1. What are we talking about?

*In widgetology, it's long been understood that you have to glomp the widgets before you can squiffle them.*

2. What is the problem?

*But there is still no known general method to determine when they've been sufficiently glomped.*

3. Why hasn't anyone else answered this problem?

*The literature describes several specialist techniques that measure how wizzled or how whomped the widgets have become during glomping, but all of these involve slowing down the glomping, and thus risking a fracturing of the widgets*

4. What is your new idea?

*In this thesis, we introduce a new glomping technique, which we call googa-glomping, that allows direct measurement of whiffalization, a superior metric for assessing squiffle-readiness.*

5. What did you do?

*We describe a series of experiments on each of the five major types of widget, and show that in each case, googa-glomping runs faster than competing techniques, and produces glomped widgets that are perfect for squiffing.*

6. Why should I care?

*We expect this new approach to dramatically reduce the cost of squiffled widgets without any loss of quality, and hence make mass production viable.*

## Abstract MadLibs!!

This paper presents a \_\_\_\_\_ method for \_\_\_\_\_  
(synonym for new) (sciencey verb)

the \_\_\_\_\_. Using \_\_\_\_\_, the  
(noun few people have heard of) (something you didn't invent)

\_\_\_\_\_ was measured to be \_\_\_\_\_ +/- \_\_\_\_\_  
(property) (number) (number)

\_\_\_\_\_. Results show \_\_\_\_\_ agreement with  
(units) (sexy adjective)

theoretical predictions and significant improvement over  
 previous efforts by \_\_\_\_\_, et al. The work presented  
(Loser)

here has profound implications for future studies of  
 \_\_\_\_\_ and may one day help solve the problem of  
(buzzword)

\_\_\_\_\_.  
(supreme sociological concern)

**Keywords:** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_  
(buzzword) (buzzword) (buzzword)

# Writing an abstract for a specific conference/journal

- Scope
- Audience
- Format





Disruption of the head direction cell network impairs the parahippocampal grid cell signal

Shawn S. Winter, Benjamin J. Clark, Jeffrey S. Taube

(1) Navigation depends on multiple neural systems that encode the moment-to-moment changes in an animal's direction and location in space. (2) These include head direction (HD) cells representing the orientation of the head and grid cells that fire at multiple locations, forming a repeating hexagonal grid pattern. (3) Computational models hypothesize that generation of the grid cell signal relies upon HD information that ascends to the hippocampal network via the anterior thalamic nuclei (ATN). (4) We inactivated or lesioned the ATN and subsequently recorded single units in the entorhinal cortex and parasubiculum. (5) ATN manipulation significantly disrupted grid and HD cell characteristics while sparing theta rhythmicity in these regions. (6) These results indicate that the HD signal via the ATN is necessary for the generation and function of grid cell activity.

Cycles of species replacement emerge from locally induced maternal effects on offspring behavior in a passerine bird

Renée A. Duckworth, Virginia Belloni, Samantha R. Anderson

(1)An important question in ecology is how mechanistic processes occurring among individuals drive large-scale patterns of community formation and change. (2)Here we show that in two species of bluebirds, cycles of replacement of one by the other emerge as an indirect consequence of maternal influence on offspring behavior in response to local resource availability. (3)Sampling across broad temporal and spatial scales, we found that western bluebirds, the more competitive species, bias the birth order of offspring by sex in a way that influences offspring aggression and dispersal, setting the stage for rapid increases in population density that ultimately result in the replacement of their sister species. (4)Our results provide insight into how predictable community dynamics can occur despite the contingency of local behavioral interactions.

## Spatially structured photons that travel in free space slower than the speed of light

Daniel Giovannini, Jacqueline Romero, Václav Potoček, Gergely Ferenczi, Fiona Speirits, Stephen M. Barnett, Daniele Faccio, Miles J. Padgett

(1) That the speed of light in free space is constant is a cornerstone of modern physics. (2) However, light beams have finite transverse size, which leads to a modification of their wave vectors resulting in a change to their phase and group velocities. (3) We study the group velocity of single photons by measuring a change in their arrival time that results from changing the beam's transverse spatial structure. (4) Using time-correlated photon pairs, we show a reduction in the group velocity of photons in both a Bessel beam and photons in a focused Gaussian beam. (5) In both cases, the delay is several micrometers over a propagation distance of  $\sim 1$  meter. (6) Our work highlights that, even in free space, the invariance of the speed of light only applies to plane waves.

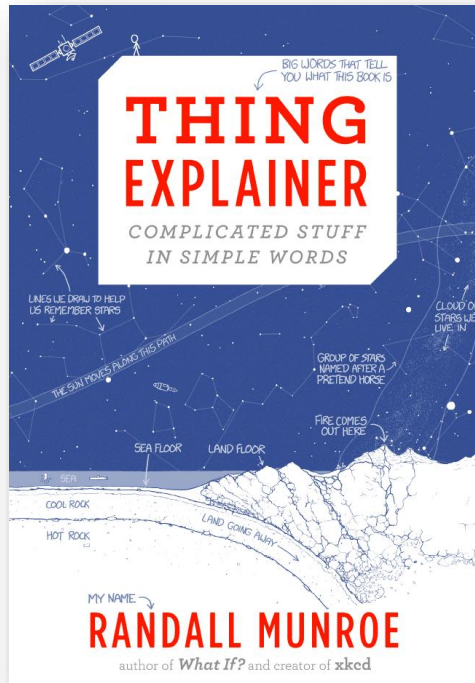
# Best practices for abstract writing

- Write the abstract last
- Everything in the abstract **MUST** be in the paper
- Write in concise, complete sentences
- Use past tense
- Jargon should be appropriate for audience
- Don't include citations (generally)
- Use only common abbreviations and acronyms
- Do not refer to figures or tables in the text

# References

- How to write a scientific abstract in six easy steps:  
<http://www.easterbrook.ca/steve/2010/01/how-to-write-a-scientific-abstract-in-six-easy-steps/>
- How to write a good abstract for a scientific paper or conference presentation by Chittaranjan Andrade (Indian J. Psychiatry, 53:172–175, 2011).
- How to Write a Paper in Scientific Journal Style and Format:  
<https://www.bates.edu/biology/files/2010/06/How-to-Write-Guide-v10-2014.pdf>

# The Thing Explainer



<https://xkcd.com/thing-explainer/>

## TINY BAGS OF WATER YOU'RE MADE OF

Everything that's alive is made of tiny bags of water. Some living things are made of just one bag of water. Those things are usually too small to see. Other things are made of a group of lots and lots of these bags that are working together to read this page.

These bags are full of smaller bags. Life uses lots of bags. All life is made from different kinds of water, and a bag keeps the stuff inside it from touching the stuff on the outside. By using bags, living things can keep different kinds of water in one place without it all coming together.

Some of the little bags you see here were once living things on their own. Long ago, some little green bags learned to get power from the Sun. Then they got stuck inside other bags, and those became flowers and trees. The green color of leaves comes from the children of those little green bags.

### LITTLE ANIMALS

These are living things (not really "animals") that got stuck in our bags of water a long time ago, like the green things in tree leaves. Now we can't live without each other. They get food and air from our bodies and turn them into power for our bags.

### OUTSIDE WALL

The water bags that make up animals have soft walls. The bags in trees and flowers, which don't need to move around as much as us, have a less soft outside layer.

### GETTING IN AND OUT

Some things can go through the bag's wall on their own. Other things can only go through if the bag helps them, either by letting them through an opening, or by making part of the wall into a new bag to hold them.

### SIZE

These bags are almost always too small to see. In fact, they're almost as small as the waves of light we see with.

BLUE  
GREEN  
RED

### BAG FILLER

This machine fills little bags with stuff and then sends them out into the water. Some stuff gets sent out of the bag bag to another part of your body. The machine also fills bags with death water, marking them very carefully before sending them out so they don't get used in the wrong place.

### THINGS THAT MAKE YOU SICK

These tiny things can get into your bags and take control of them. When they do that, they use the bag to build more of them.

When this kind of thing gets into you, your body gets hot, your legs hurt, and you have to lie down. Your whole body feels bad, and it makes you hate everything. You feel like you're going to die, but usually, don't. We say all life is made of bags, but these things aren't. They also can't make more of themselves; they have to get a bag to make them. So we don't know if it makes sense to say they're "alive." They're more like an idea that spreads itself.

### EMPTY POCKETS

This part of the bag has pockets to hold stuff that it might need later. It also makes a few things. One of the things it makes is that stuff that helps your arms and legs get stronger. Sometimes, people who want to get an iron fist will put bottles of that stuff into their body and then lie about it.

### CONTROL AREA

This area in the middle holds information about how to make the different parts of your body. It writes this information in notes and sends them out into the bag. Bags make more bags by breaking in half. When that happens, the control area also breaks in half, and each half gets a full set of the bag's information.

Not all bags have these control areas. The bags in human blood don't (which means blood can't grow) but the bags in bird blood do. This control area may have once been a living thing on its own, just like the green things in leaves.

### INFORMATION

The information for how to make different body parts is stored here.

### READERS

These machines read the information about how to make parts and write it on little notes, then send them out through the holes in the wall.

### MACHINE MAKER

This part makes the little machines that sit outside the control area.

### CONTROL AREA HOLES

Notes and workers go out through these openings.

### LITTLE BUILDERS

This area is covered in little building machines that build new parts for the bag. The builders sit just outside the control area, reading the notes from inside that tell them what to build. After the builder reads a part, the part falls away from the bag. Each part has a job to do. Maybe its job is to tell another part it's time to stop working. Maybe its job is to turn one kind of part into another. Maybe it makes another part or something different. Or maybe it has a job, but waits until it sees another part before it starts working. The strange thing is, no one tells the part where to go. It just falls out into the room with all the other parts, and hangs around until it runs into whatever part it's supposed to grab. Or until another part grabs it. This sounds strange, and it is! There are so many parts, and they're all grabbing each other and dropping each other. The middle of these bags are harder to understand than almost anything else in the world.

### STRANGE BOXES

There are lots of these little boxes in our water bags. We don't know what they do.

### BAGS OF DEATH WATER

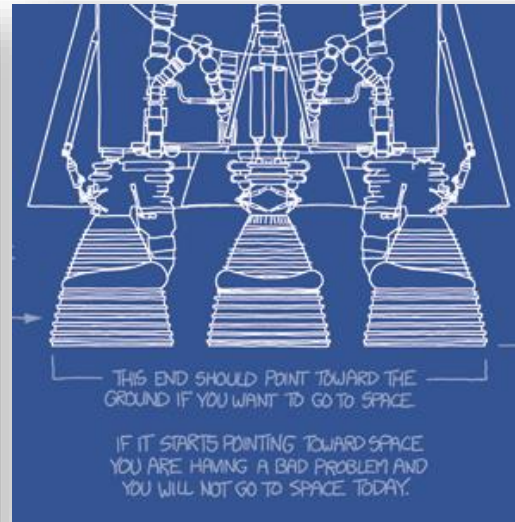
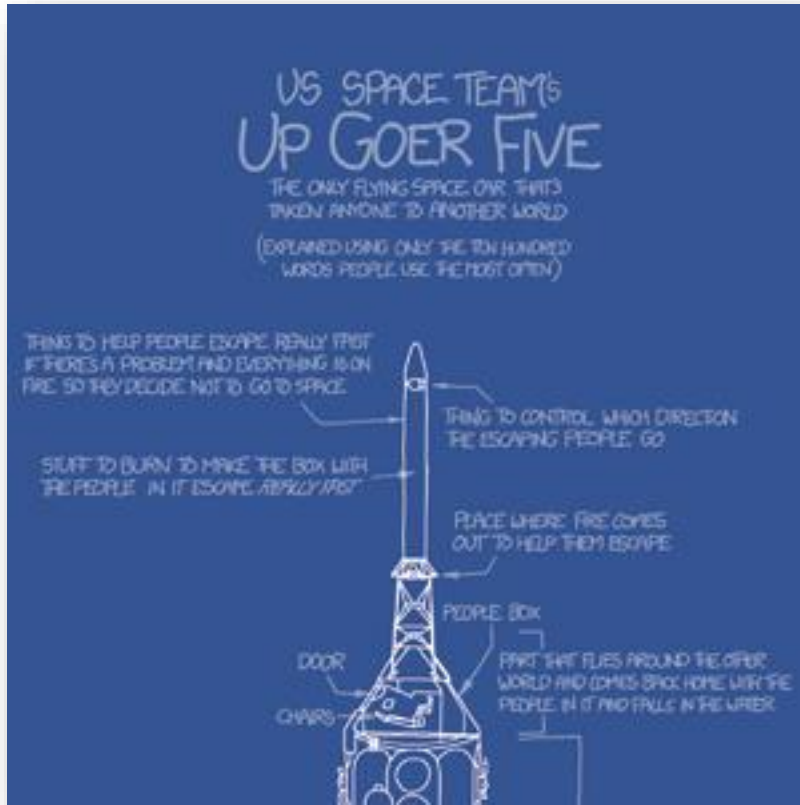
These little bags are full of a kind of water that breaks things into tiny pieces. If something is just inside them, the water breaks it down into whatever it's made of. If something goes wrong, these little bags tear open and all their bad water falls out. That makes the whole bag around it fall to pieces and die.

"Bags falling to pieces" sounds bad, since bags are what you're made of. But if a bag was having problems, it could hurt you. The death water helps clear it away so your body can make a new one.

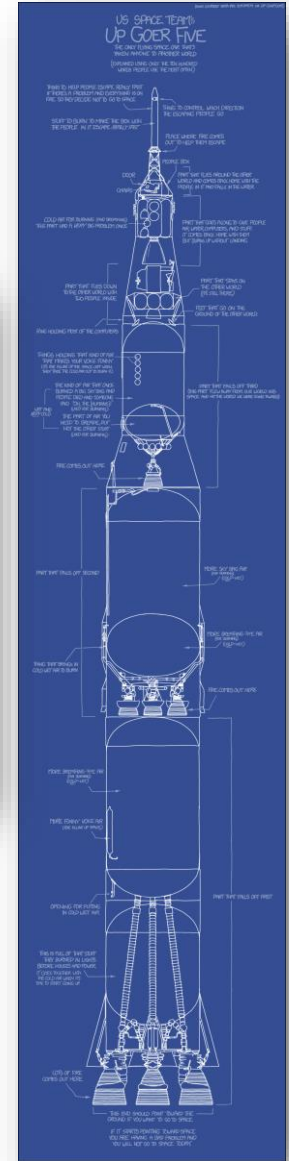
### BAG SHAPERS

The space between bag parts is full of lots of very thin hair-like lines. There are like bones for the bag. They help hold its shape, and do some other things. Some of these shapers also have holes down the middle, and can carry things from one part of the bag to another.

# Space Travel Simplified



<http://xkcd.com/1133/>





# A Scientist/Engineer Walks into the Room...

## **Modeling Conduction Velocity After Activity Dependent Electrical Stimulation Alters Myelin Post Spinal Cord Injury**

Following an incomplete spinal cord injury (SCI), axons undergo demyelination, and oligodendrocytes begin remyelinating the remaining, intact axons. However, these new sheaths of myelin result in a slower conduction velocity of action potentials partially because they are thinner. Previous research has shown that neuronal activity can increase myelination and improve gait. In this blind, pilot project, we explore whether *in vivo* targeted activity driven spinal stimulation (TADSS) has similar effects. We have seen substantial recovery of forelimb motor performance after cervical SCI with TADSS; this project examines whether faster conduction velocities due to alterations in white matter could serve as a mechanism explaining this phenomenon. We hypothesize that activity dependent stimulation will globally mitigate thinning of descending motor axons found at the epicenter of the injury and caudal to it. Eventually, we will measure other parameters that affect conduction velocity such as the internode length of myelin and more fully test the conduction speed by looking for evoked responses *in vivo*.

# Advanced/Specific Vocabulary? Requisite Knowledge?

## Modeling Conduction Velocity After Activity Dependent Electrical Stimulation Alters Myelin Post Spinal Cord Injury (Alexis Drake, 2015, abbreviated abstract)

Following an **incomplete spinal cord injury (SCI)**, **axons** undergo **demyelination**, and **oligodendrocytes** begin **remyelinating** the remaining, intact **axons**. However, these new **sheaths** of **myelin** result in a slower **conduction velocity** of **action potentials** partially because they are thinner. Previous research has shown that **neuronal** activity can increase **myelination** and improve **gait**. In this blind, pilot project, we explore whether **in vivo targeted activity driven spinal stimulation (TADSS)** has similar effects. We have seen substantial recovery of **forelimb motor performance** after **cervical SCI with TADSS**; this project examines whether faster **conduction velocities** due to alterations in **white matter** could serve as a mechanism explaining this phenomenon. We hypothesize that **activity dependent stimulation** will globally **mitigate** thinning of **descending motor axons** found at the **epicenter** of the injury and **caudal** to it. Eventually, we will measure other parameters that affect **conduction velocity** such as the **internode** length of **myelin** and more fully test the **conduction** speed by looking for **evoked responses in vivo**.

# A Journalist, Kid, Your Grandma Walks into the Room...

The brain controls our body. It talks through cells in our backs that go all the way to our other body parts and make them move. The brain tells them what to do like cars driving down a fast road.

When someone hurts their back, it's like a car hits another car and causes a back up, blocking the road. They then lose some control over moving their body. Cells in their back try fixing themselves. However, the new cells don't work as well. They are slower. It is like the cars have to go out of their way and use smaller roads, and it takes longer to get places.

In the long run, we are trying to see if shocking the cells in the back when a hurt animal is trying to reach for a piece of food will help them. We hope that the shock will give the cells a thicker covering because a thicker covering is like a faster road.

# The Challenge: Can You Explain a Hard Idea Using Only the Ten Hundred Most Used Words? It's Not Easy!

<http://splasho.com/upgoer5/>



HINTS TOP LATEST LIBRARY RANDOM

## THE UP-GOER FIVE TEXT EDITOR

CAN YOU EXPLAIN A HARD IDEA USING ONLY THE TEN HUNDRED MOST USED WORDS? IT'S NOT VERY EASY. TYPE IN THE BOX TO TRY IT OUT.

For next week!

# Your UpGoer Abstracts

You will present your UpGoer abstract on August 9 during Sci. Communications Class.

Your final (“real”, non-UpGoer) abstract is due on Wednesday, August 10 at noon. This will be used in the Research Symposium Program.

**Maximum abstract length = 300 words**