

**NW Noggin:  
Action and Potential in  
Outreach, Education &  
Research**



**Northwest  
Noggin**



**Noggin @ BraiNY 12/5!**

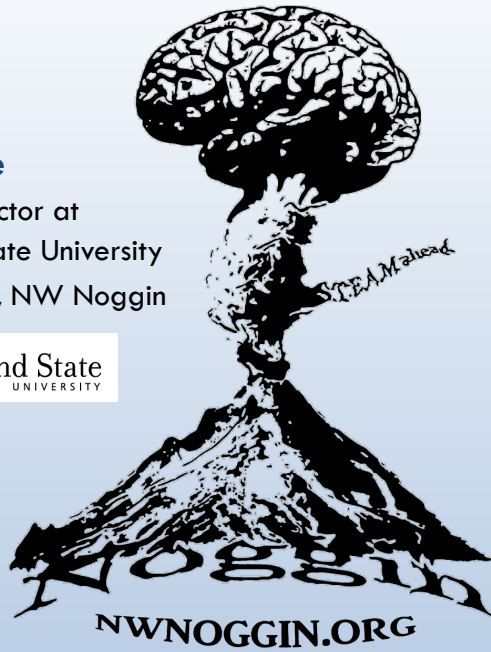
**nwnoggin.org**

# Jeff Leake



## Jeff Leake

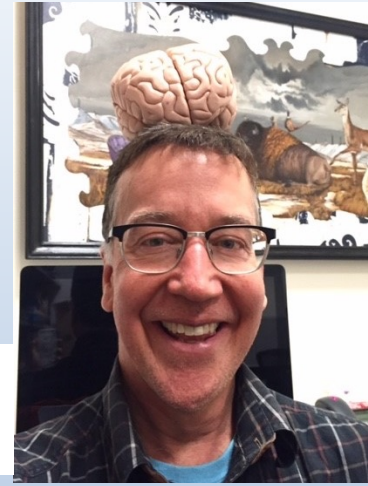
Artist, Instructor at  
Portland State University  
Co-Founder, NW Noggin



[NWNOGGIN.ORG](http://NWNOGGIN.ORG)

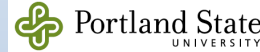
**Jeff Leake, M.A.** currently teaches interdisciplinary art and neuroscience courses in the Psychology and University Studies departments at Portland State University. He is also the president, co-founder and arts coordinator of the nonprofit NW Noggin. A working artist, Jeff has completed prestigious residencies in Shanghai, Nevada, Wyoming (UCross), and Latvia. He has traveled the U.S. lecturing and teaching neuroscience through art and was recognized as an innovator by the Obama White House.

# Bill Griesar



## Bill Griesar

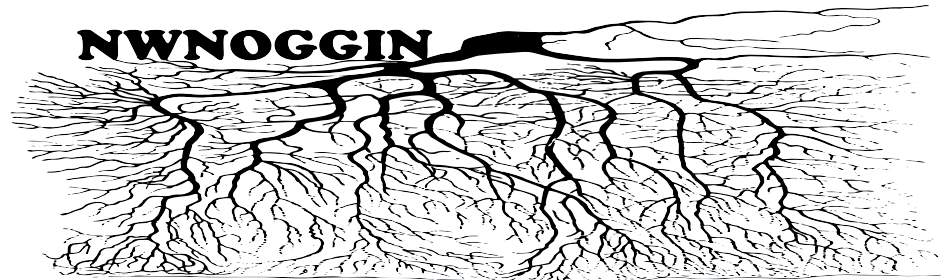
Teaching Assistant Professor  
at Portland State University  
Affiliate Graduate Faculty,  
Oregon Health & Science  
University  
Co-Founder, NW Noggin



**Bill Griesar, Ph.D.** is a Teaching Assistant Professor in Psychology/Neuroscience at Portland State University and co-founder and Neuroscience Coordinator of NW Noggin. He has developed and taught arts-integrated neuroscience courses at PSU and OHSU since 2001 and helped create an interdisciplinary neuroscience minor at PSU. Through NW Noggin he's met with more than 60,000 K-12 students over real brains and art. He's been recognized as an innovator by the Obama White House and has won numerous teaching awards.



**NWNOGGIN**



[nwnoggin.org](http://nwnoggin.org)

Arts integrated neuroscience  
outreach for K-12 & community



**TEN YEARS!**  
**ALL VOLUNTEER (everyone)**  
**60,000+ community members**

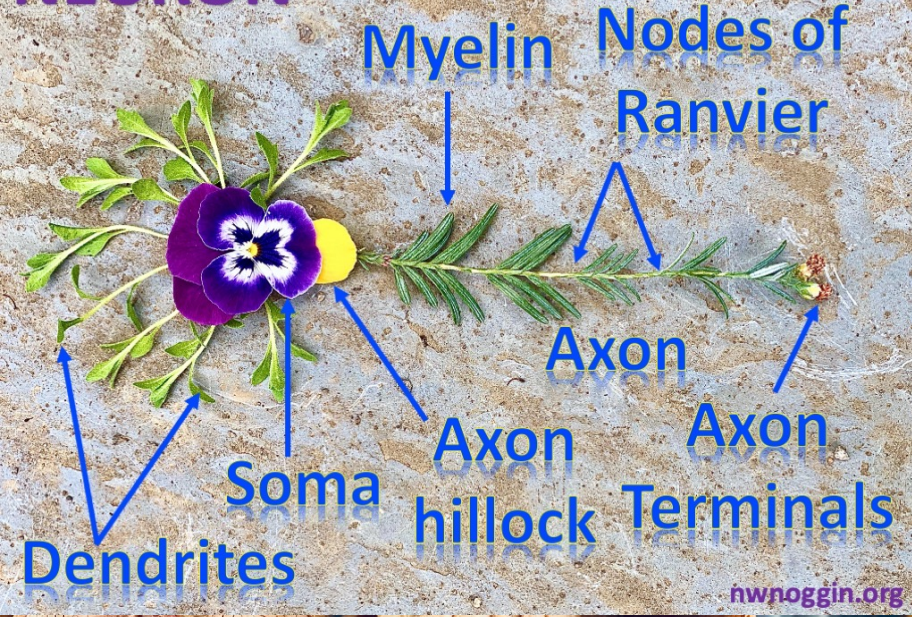




# Art & Brains!



## NEURON





**Sleep**  
**Anxiety**  
**Depression**  
**ADHD**  
**Autism**  
**Development**  
**Perception**  
**Drugs**  
**Memory**  
**Language**  
**Racial Bias**

...



***What you do  
has relevance  
GO PLACES***



**We all pay for research**





**Greater understanding**  
**More support for research**  
**Increased participation**  
**Less confirmation bias**  
**New directions**  
**FUN!**

**Connections matter**



# BUILD NEW CONNECTIONS



- **Academic priority K-12, urban/rural communities, tribal majority schools**
  - Not always well-funded, or valued, often ignored, subjected to standardized testing that primarily benefits others. Complex brain development underway, unacknowledged diversity, racism, bias, police brutality, mental health,...
- **Young graduate researchers, undergraduates (Portland State University, OHSU,...)**
  - *How does my research relate to the world? How can I explain it? Where can I go from here?*
- **Houseless youth (p:ear), incarcerated youth (MacLaren/Coffee Creek Correctional Facilities)**
  - *“It’s like people see me as an object, not as a human being”*
- **Artists: Painters, Dancers, Storytellers, Musicians, Poets**
  - *How does my work relate to other fields? How do I connect with new audiences?*
  - *How is my practice influenced and enriched by discoveries about the brain?*
- **Community organizations**
  - TRIO, Area Health Education Centers (AHECs), American Brain Coalition,...
- **Area businesses (BioGift, Intel, Fort George, Floyds/Street 14, Hospitals)**
  - *How can we better connect with everyone in our community?*
- **Members of the public**
  - *Why are my taxes spent on research? Art? What are we discovering? Making?*





# Why art & brains..?

- Motivation, engagement, **empathy**
- Exploration, creativity, INNOVATION
- **Personal relevance of STEAM material**



Building a #rosehipneuron in  
#pipecleaners 🧡 #nwnoggin 🧠🎨  
#sciart #scicomm 🦋  
[nwnoggin.org/2018/08/31/ros...](https://nwnoggin.org/2018/08/31/ros...)





To see other people



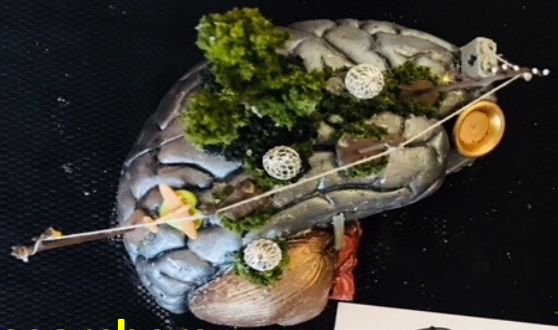
# HOMELESSNESS & THE BRAIN

Thurs, Oct 19th  
10am - 1pm



p:ear

Researchers  
Clinicians  
Policy makers  
Houseless youth



Bunny:  
"we are all  
connected"

p:ear mentor gallery  
338 NW 6th Ave

[nwnoggin.org](http://nwnoggin.org) [pearmentor.org](http://pearmentor.org)

STREET KIDS  
ART  
NEURO-  
SCIENCE



# Rural Outreach

**TO GO PLACES!**

Astoria, Warrenton, Seaside, OR  
Pop: ~23,000

Davenport, WA  
Pop: ~1,700

Amity & Willamina, OR  
Pop: ~4,000

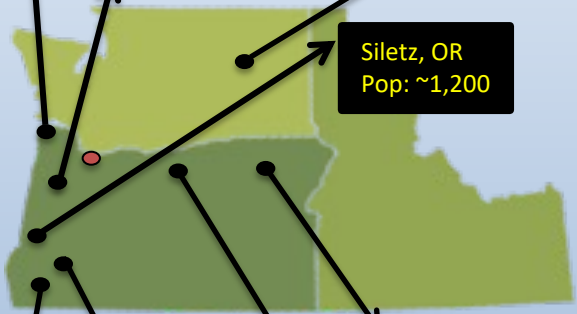
Siletz, OR  
Pop: ~1,200

La Grande, OR  
Pop: ~13,000

Grants Pass, OR  
Pop: ~39K

Heppler & Ione, OR  
Pop: ~1,240

Meservy Meadows, OR  
Pop: ~40



Food, housing, baby goats...





# Synapses, Stories and Song!



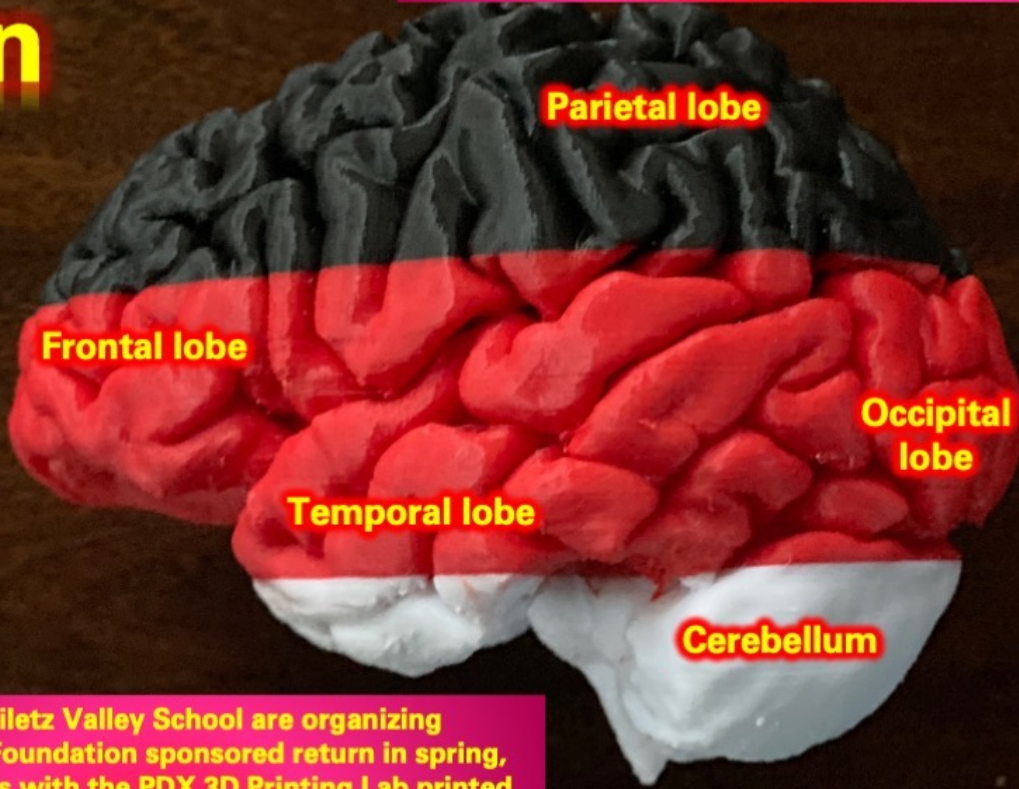
Tribal majority schools





# Ch'e'-tuk Brain

Ch'e'-tuk ("chay-tuck") is "woodpecker scalp" in Dee-ni'. The scarlet scalps of woodpeckers are among the most vibrant, brightest reds in nature, and are used in Siletz headdresses and other ceremonial regalia.



NW Noggin & Siletz Valley School are organizing a Roundhouse Foundation sponsored return in spring, 2023. Volunteers with the PDX 3D Printing Lab printed 20+ woodpecker red brains for teachers, thanks to materials donated by the Portland Alcohol Research Center (PARC) at OHSU.

#showusyourbraincell  
nwnoggin.org



# Noggin + TRIO



Oregon Coast Fall, 2021



# Noggin + TRIO

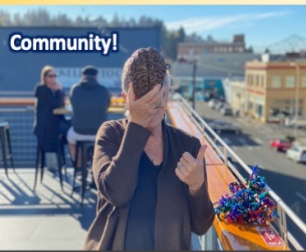


**Community  
Connections**

**NOGGINS ON THE  
OREGON COAST**

*The Stand, Seaside*

[nwnoggin.org](http://nwnoggin.org)



Community!



*Fort George Brewery, Astoria*



*Rosebriar Mansion, Astoria*



*Astoria Coop*



*Peter Pan  
Market, Astoria*

**THANK YOU FOR SUPPORTING  
ART/NEUROSCIENCE OUTREACH!**

**Astoria Middle School, Seaside Middle School  
West Exchange Preschool, Astoria High School**



*Jasmin Mabry  
Ellie Phelps  
Michael Deveney  
Greyson Moore  
Lidia Echeverria-Garcia  
Jeff Leake  
Bill Griesar  
William Leverette*

**October 4 - 7, 2021**

**Noggin on the Coast**





N.W. Noggin  
@NWNoggin

“What causes that feeling of #paralysis as you’re falling asleep? Does #daylightsavingstime affect sleep? Why is #sleep important for #brains? What brings on #nightmares?”

#nwnoggin @ #astoriaoregon high school  
🎨👉 [nwnoggin.org/event/noggins-...](https://nwnoggin.org/event/noggins-...)

#outreach #allvolunteer ❤️



N.W. Noggin  
@NWNoggin

“Can you get a #concussion in your #entericnervoussystem or #microbiome? Is the #brain like a computer? What part of the brain is involved w/#rhythm & making your foot tap? Do you ever see a brain that’s smooth?”



N.W. Noggin  
@NWNoggin

“I saw #mycelium in the forest and it looks like #brain cells 🍄! I think my #brain learns through stories” 🤗  
🧠👉🐼👉🤗! Yes ❤️

Some of the deepest insights and questions from #preK today 😊😊

#nwnoggin #oregoncoast 🐦🌊👉👉  
[nwnoggin.org/event/noggins-...](https://nwnoggin.org/event/noggins-...)



N.W. Noggin  
@NWNoggin

“Does #alcoholism run in families? How does smoking cigarettes affect the brain? What about #cannabis? What happens in your #brain if you have #ADHD? #DID? Why are drugs more dangerous for kids?”

GREAT QUESTIONS @ Seaside Middle School 🧠👉  
[nwnoggin.org/event/noggins-...](https://nwnoggin.org/event/noggins-...)





# Neuroscience & Law

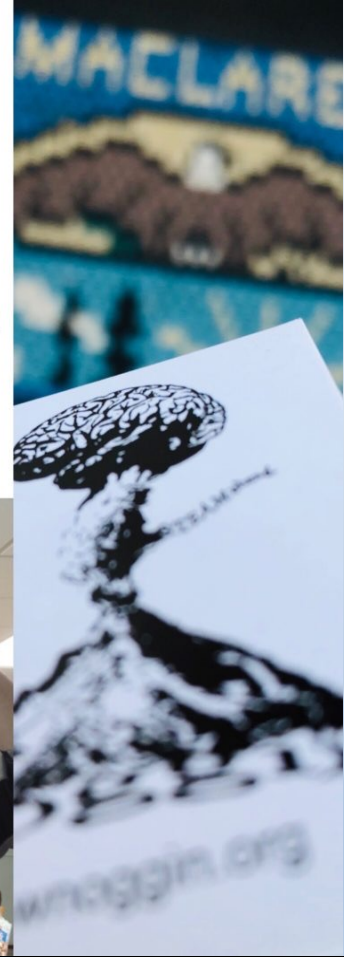
To listen, learn, empower & make change



## Youth get visual, hands-on experience with the brain

NW Noggin, a neuroscience outreach nonprofit, reached out to youth at MacLaren Youth Correctional Facility this week to teach about brain development.

 Lindsay Keefe on January 24, 2019



MacLaren Youth Correctional Facility





ORCorrections  
@ORCorrections · Follow



@NWNoggin came to Coffee Creek Correctional Facility with real human brains!! They shared them with the @Portland\_State University's metamorphosis class, and had a discussion about neuroscience and how trauma can physically affect our brains. 🧠 #brainteaser



# Coffee Creek Correctional Facility



To listen, learn, empower & make change





**At SfN conferences**



**Posters, art of neuroscience and...**



# School visits



# Public outreach and connection



# *And also to Capitol Hill*

More connections: Congressional office visits  
Congressional Neuroscience/STEAM briefing

“Bipartisan”  
neuron



**Research should inform policy**



# NOGGINFEST!

*& Art*

*& Music*

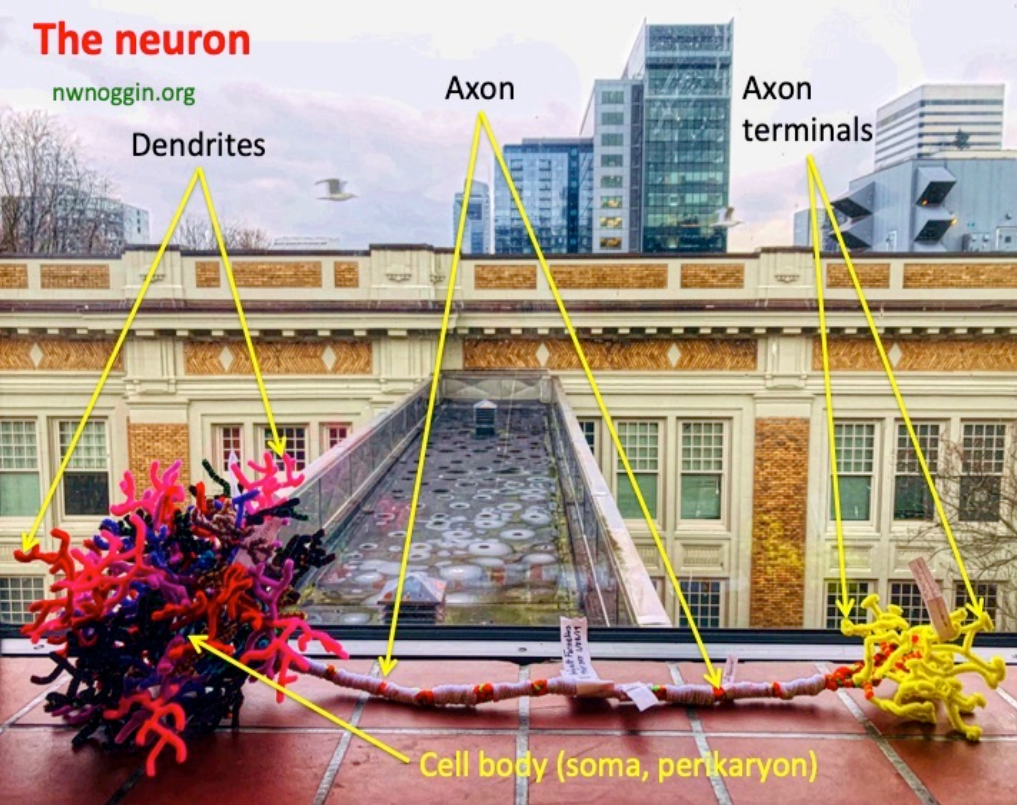
**Music, art, research,  
brains, all ages, FREE**





# The neuron

nwnoggin.org



**MAKE YOUR OWN: Details @ [nwnoggin.org](http://nwnoggin.org)**

**Pipe cleaner brain cells!**



## Making a pipe cleaner neuron...

1. Start with a good amount of (colorful) pipe cleaners, I have 20 here.



2. Create the soma or cell body by linking several pipe cleaner hoops together.



3. Attach dendrites to your soma by wrapping them around the soma pipe cleaners.



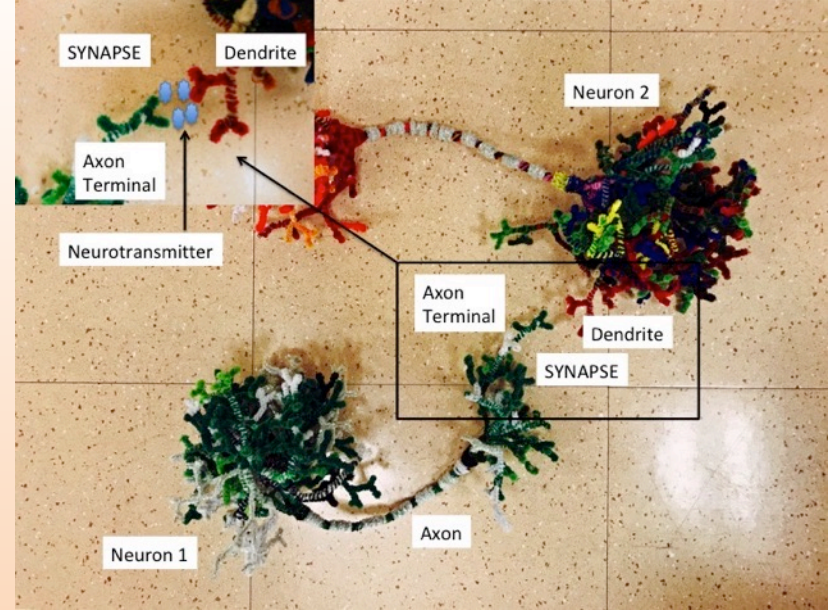
4. Attach axon terminals to the other end of your axon.



5. Wrap myelin around your axon.



6. Create a nucleus for your soma by wrapping two pipe cleaners around each other. Attach your nucleus inside your soma. You have a neuron!



# MAKE CONNECTIONS

# MAKE ART







# Public Schools

During COVID-19

**#showusyourbraincell**



## Neurons are a type of brain cell

The majority of neurons share some basic features

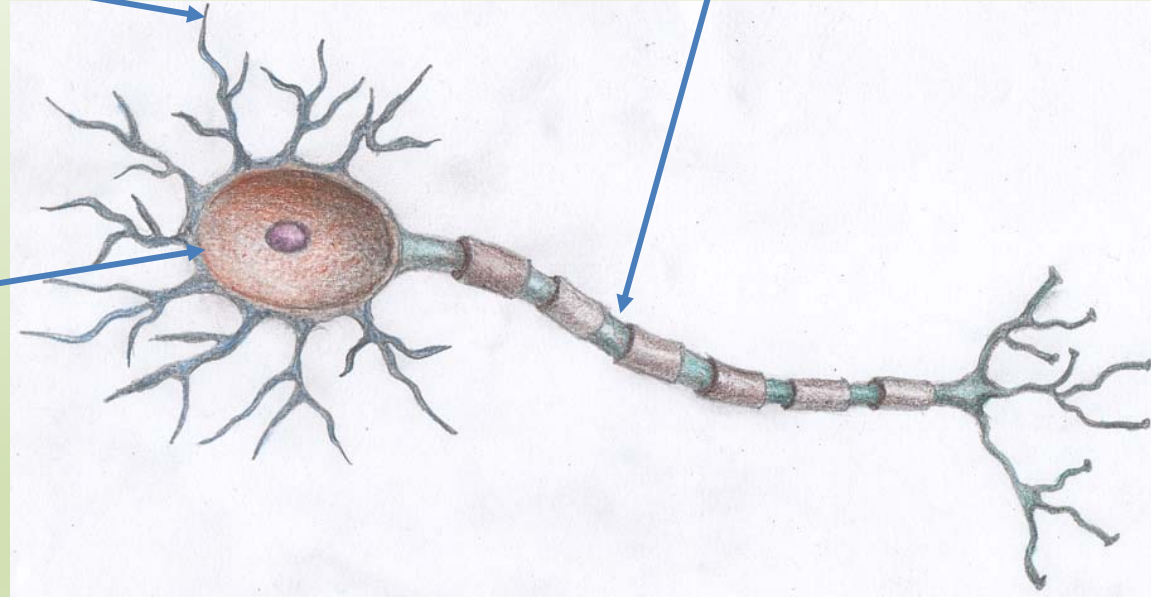
### Dendrites

(Receive input from other neurons at gaps called **synapses**)

### Cell Body

(or Soma, location of **nucleus** and cell **DNA**)

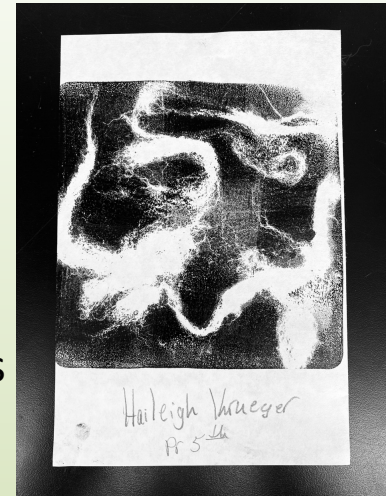
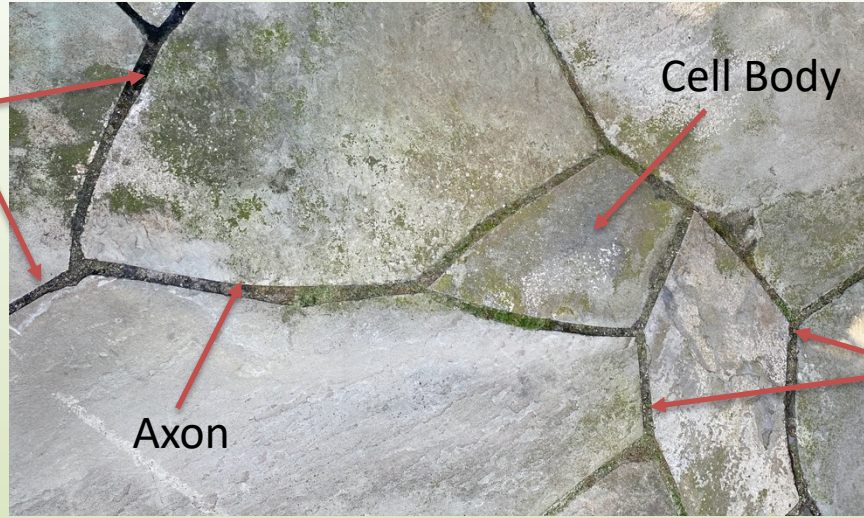
### Axon (Carries electric message)



# Found Object Brain Cells

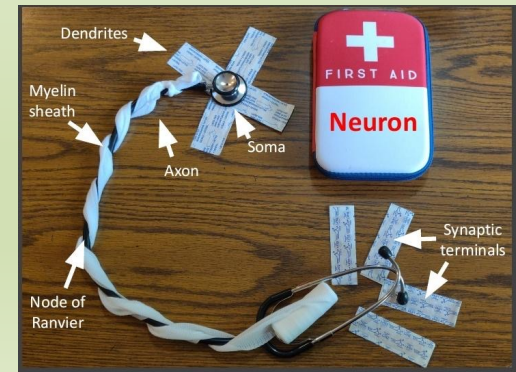


Take a look around you, what things do you see that share those structures?



Can you construct a neuron out of things that you find?

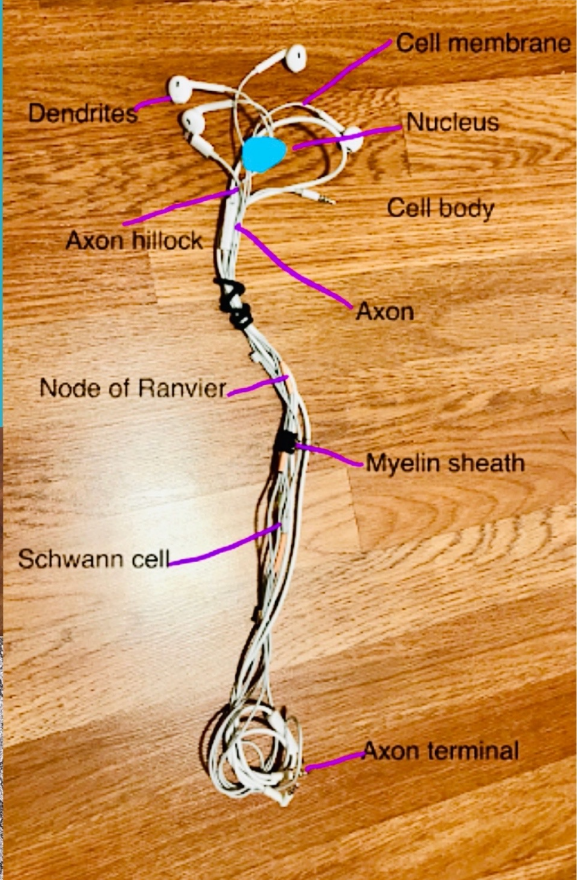
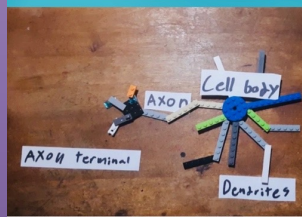
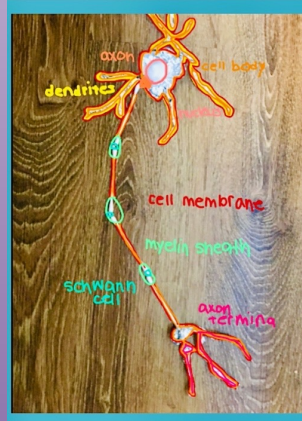
What things for you represent the function of a neuron? Or the function of specific parts of a neuron? Do those things have personal meaning, or say something about you?





# Seaweed Neuron

#showusyourbraincell



# #showusyourbraincell



# Neuron



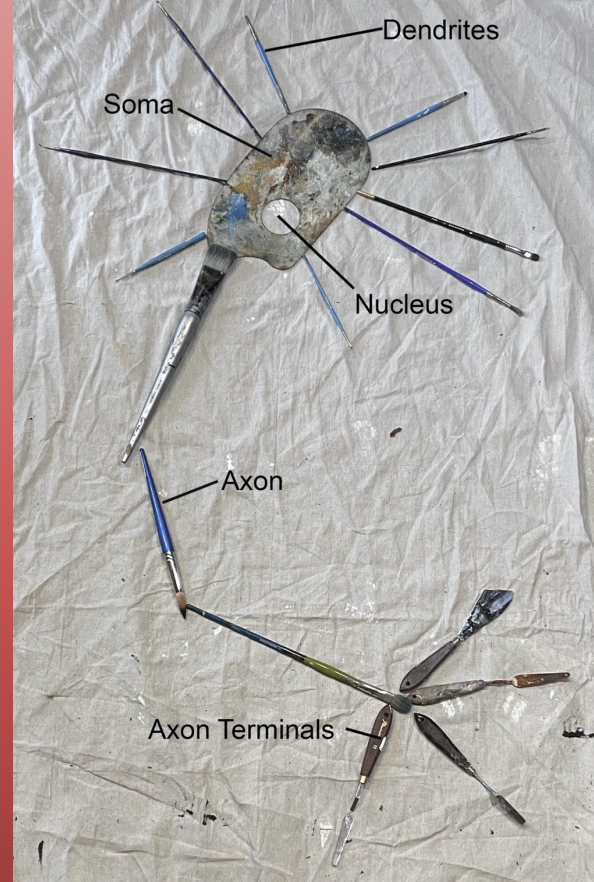
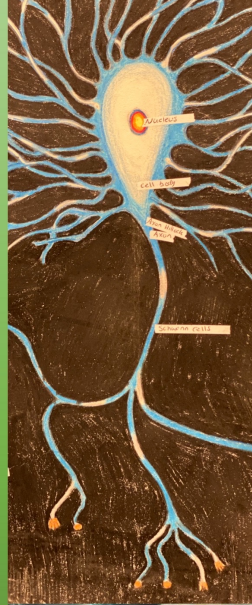
Dendrites

Soma

Axon

Axon terminals

#showusyourbraincell



Dendrites

Soma

Nucleus

Axon

Axon Terminals



# #showusyourbraincell



# Tuna Jig Neuron

#showusyourbraincell



Jigging is a type of fishing where your boat stays in place, or slowly drifts, while the line is jerked up and down to imitate the swimming of prey

In Oregon, tuna jigs are primarily used for trolling, a style of fishing where you pull hooks through water behind your boat

LEARN MORE  
<https://Seagrant.oregonstate.edu>

By Amanda Gladics,  
Oregon Sea Grant, OSU

# Serotonin Flow



By Sai Kiersarsky

#showusyourbraincell

# #showusyourbraincell

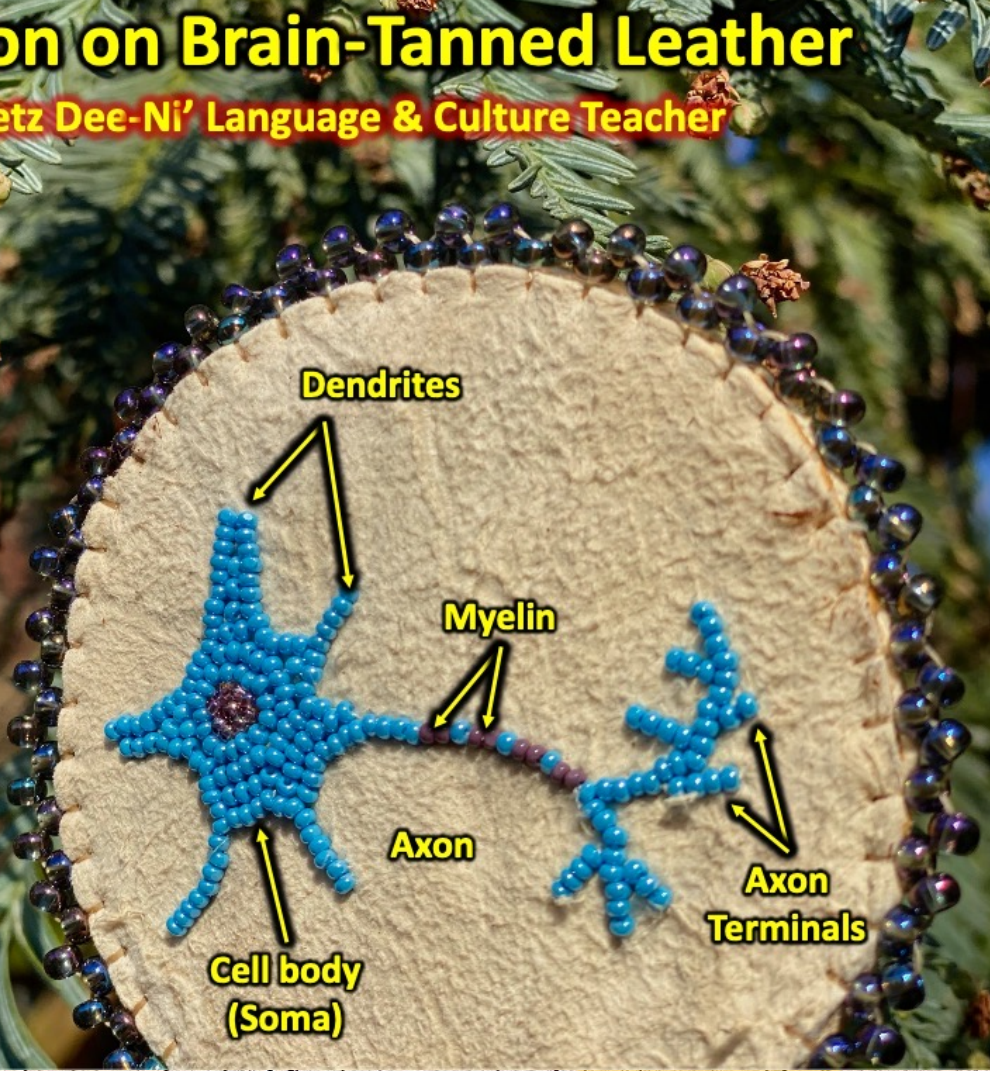


**ANY BRAIN CELLS**  
Astrocyte  
Pyramidal neuron  
Photoreceptor  
Inner hair cell  
Nociceptor  
Cerebellar granule cell  
Meissner's corpuscle

# Beaded Neuron on Brain-Tanned Leather

By Theresa Smith, Siletz Dee-Ni' Language & Culture Teacher

*"Every animal has  
enough brains to tan  
its own hide"*



#showusyourbraincell  
nwnoggin.org





#showusyourbraincell

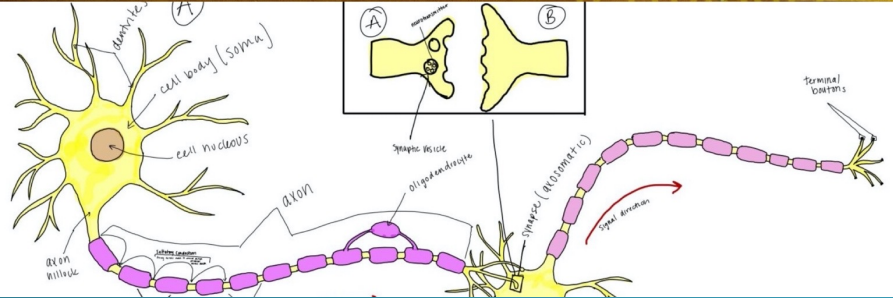
# #showusyourbraincell

Gorgeous hand-crafted photoreceptors by artist Darrin Lane

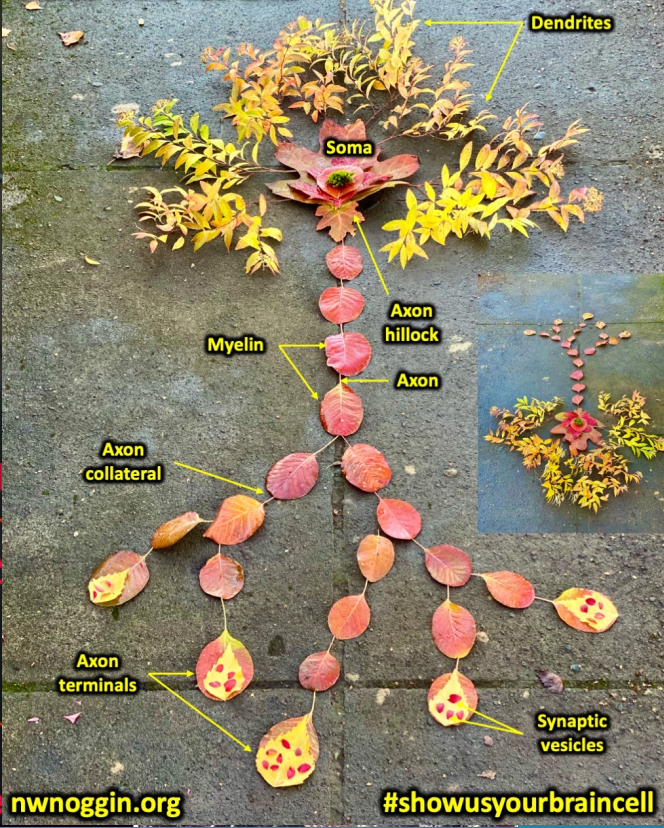
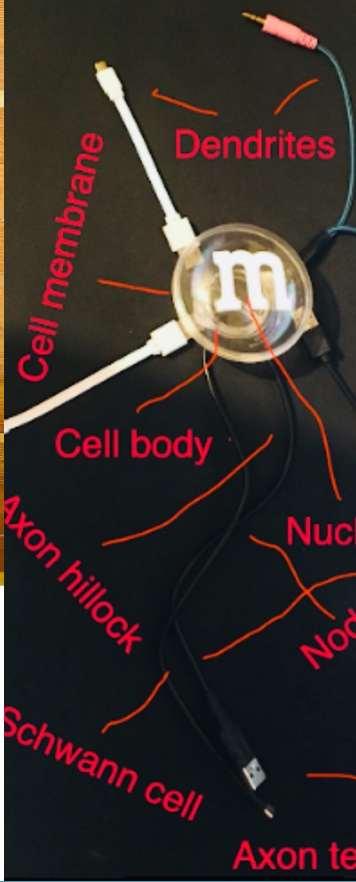
nwnoggin.org



# Neuron from the coat rack



# Fall Neuron



Axon terminals [nwnoggin.org](http://nwnoggin.org)

#showusyourbraincell

# #showusyourbraincell



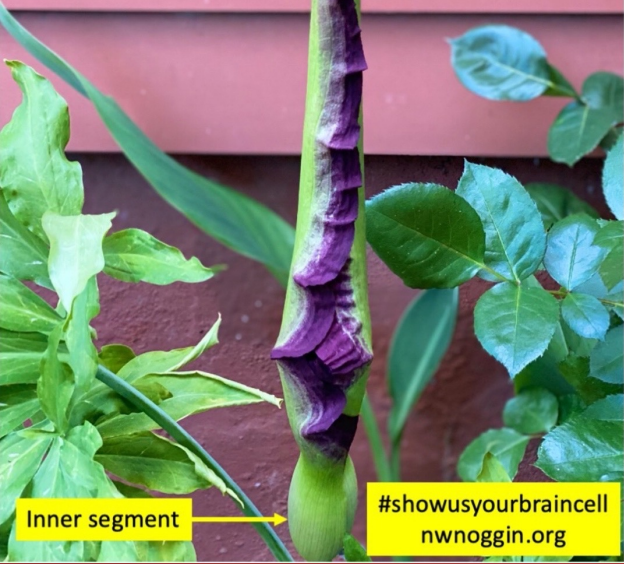
# Dracunculus Vulgaris

Smells like rotting flesh  
Pollinated by flies

Or...retinal cone cell?

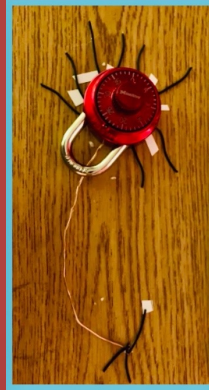
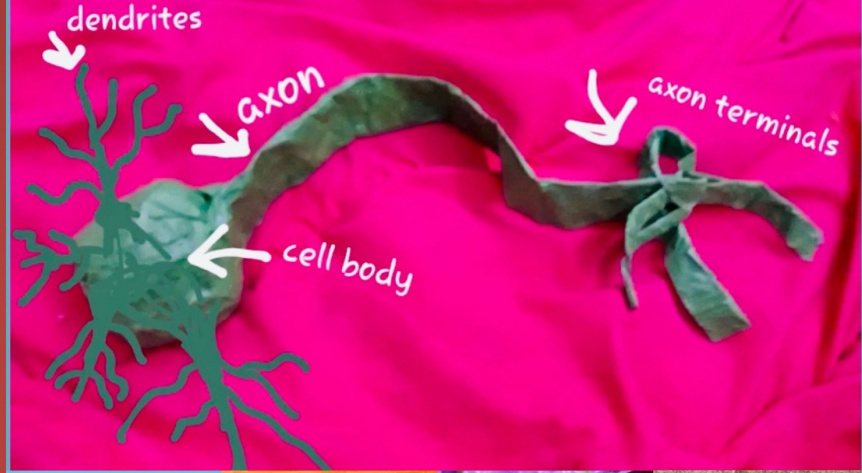
Membranous disks  
(sites of photopigment)

Outer segment



Inner segment

#showusyourbraincell  
nwnoggin.org



# #showusyourbraincell



# Taste afferent

Taste afferents are arranged like sections of an in **taste buds** on your tongue, with tiny **microvilli** poking out of **taste pores** for detecting chemicals (**tastants**) in food.



nwnoggin.org

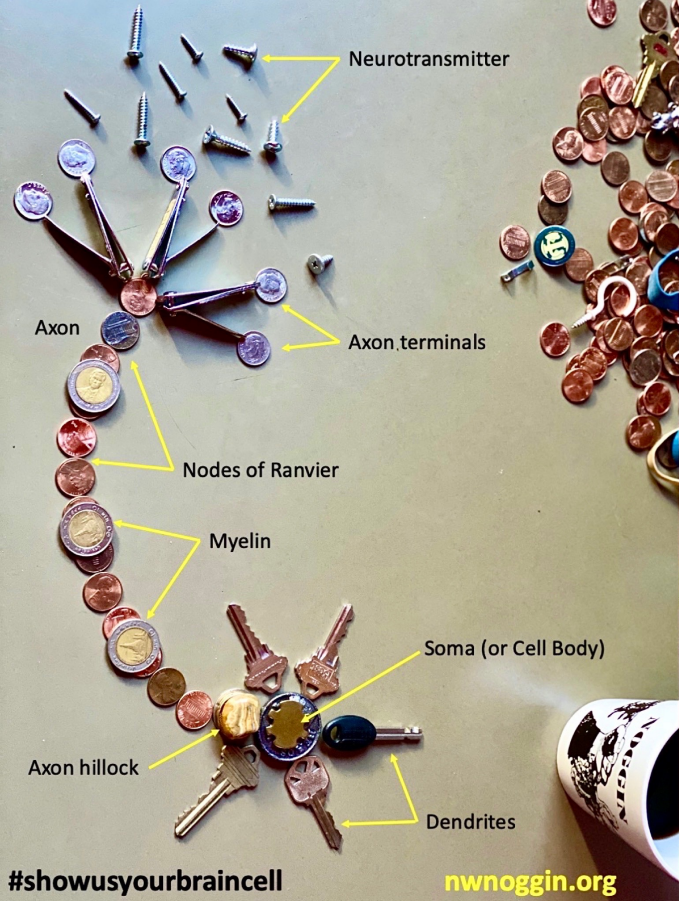


#showusyourbraincell



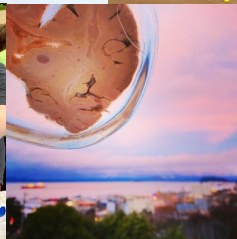
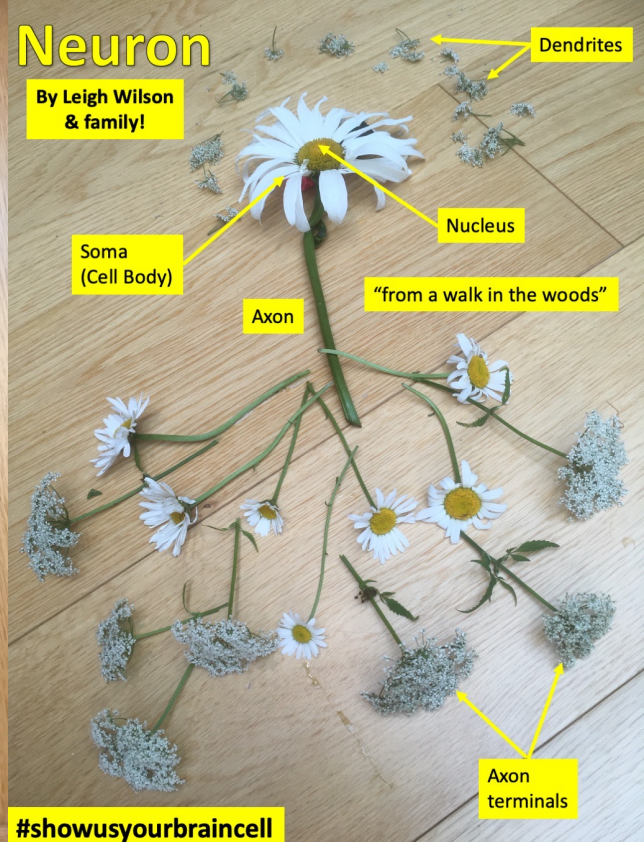
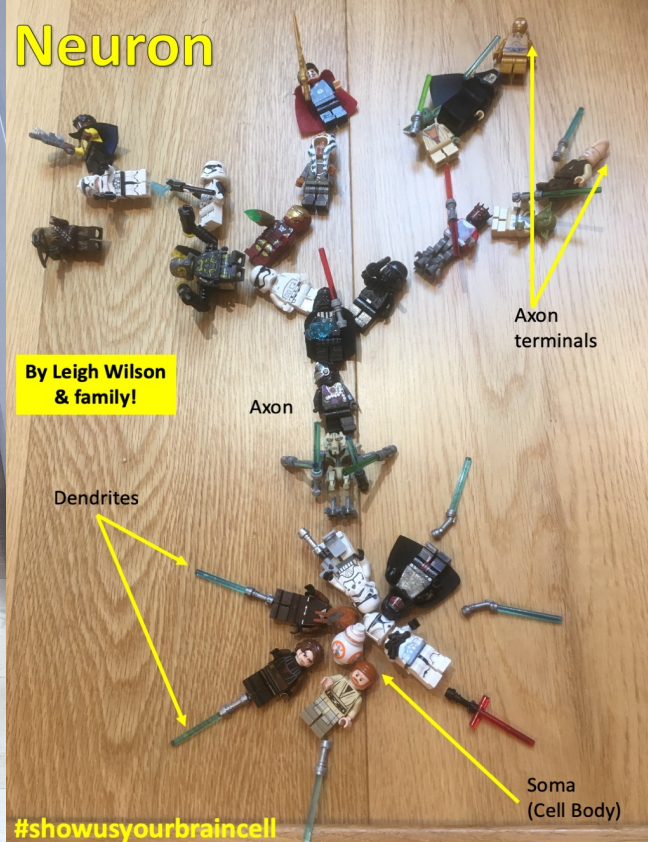
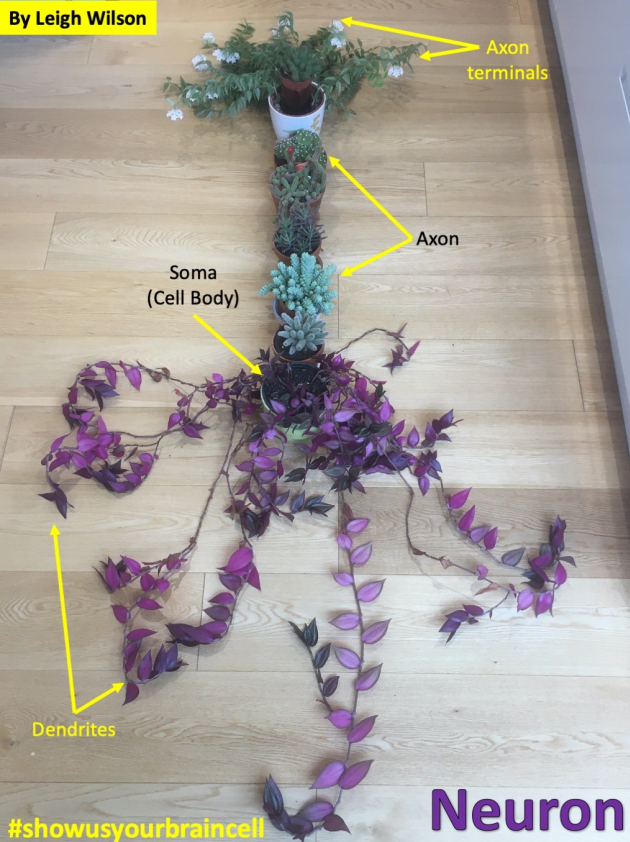
# #showusyourbraincell





# #showusyourbraincell





#showusyourbraincell



# Tear Gas Neuron

Portland Police collaborated with white nationalist gangs & used chemical weapons of war on citizens

**Portland Police**, county sheriffs, Oregon state troopers, federal DHS officers & armed members of regional hate groups **attacked Portlanders** & **press** with tear gas & impact munitions **for more than \*5\* months in 2020**.

These dendrites are clips from CS gas canisters deployed by the Portland Police, **under Police Commissioner & Mayor Ted Wheeler**, against people protesting ongoing racism and police violence against BIPOC Americans.

Portland, OR 2020

Chemicals in tear gas cause and worsen respiratory ailments

Portland Police Bureau officers used force **"more than 6,000 times"** during **"crowd-control events"** from 5/29 – 11/15  
-U.S. Department of Justice

nwnoggin.org

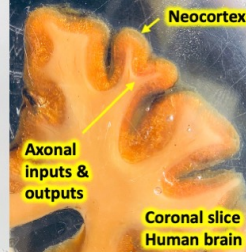
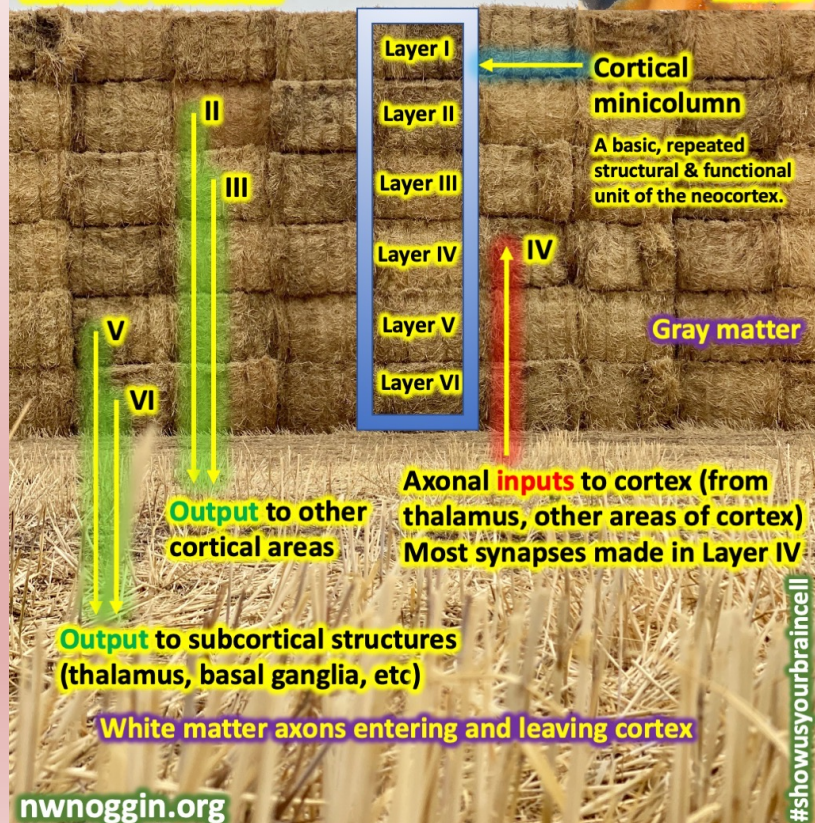
#showusyourbraincell

#showusyourbraincell

# NEOCORTEX

From straw bales in Union County, Oregon

Surface of neocortex



Axonal inputs & outputs

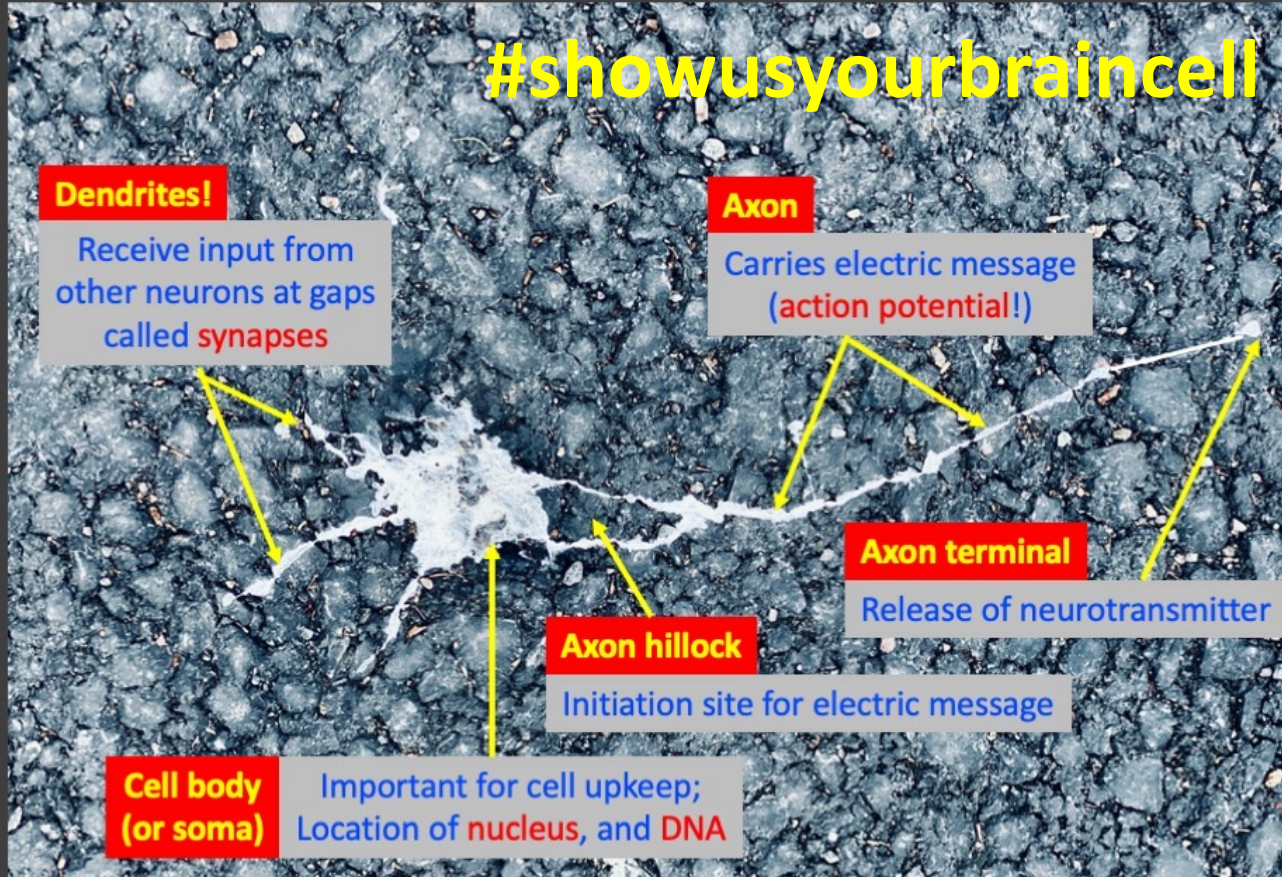
Coronal slice Human brain

#showusyourbraincell



# You can find neurons everywhere!

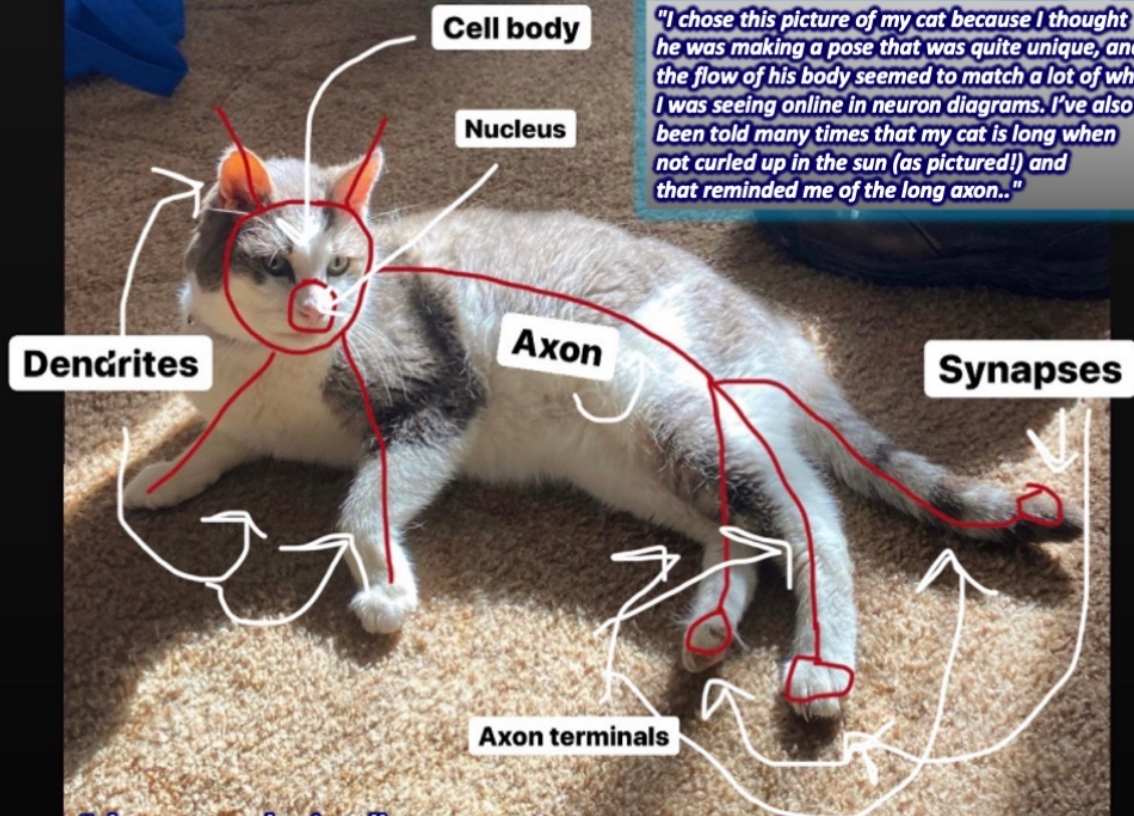
#showusyourbraincell





# Everywhere!

Leah Hutchinson, Portland State University



"I chose this picture of my cat because I thought he was making a pose that was quite unique, and the flow of his body seemed to match a lot of what I was seeing online in neuron diagrams. I've also been told many times that my cat is long when not curled up in the sun (as pictured!) and that reminded me of the long axon.."

#showusyourbraincell

## Ready for the Hersenolympiade!

SATURDAY, 2/12

2:15pm CET/5:15am Pacific!

"Brain"

"Olympics"



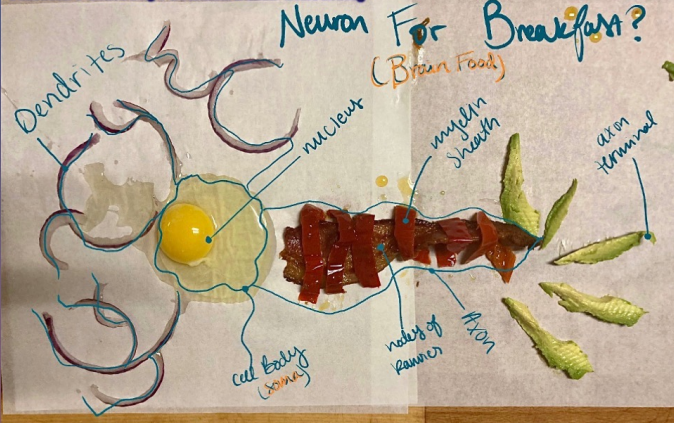
Northwest Noggin will discuss (and exhibit!) real brains, art and the intersection between the two. Join us to make your own found object brain cells and discover how the arts and neuroscience offer compelling insights into who we are.

**DUTCH NEURON**  
By Austin Howard

nwnoggin.org

#showusyourbraincell

Victoria Peterson, Portland State University

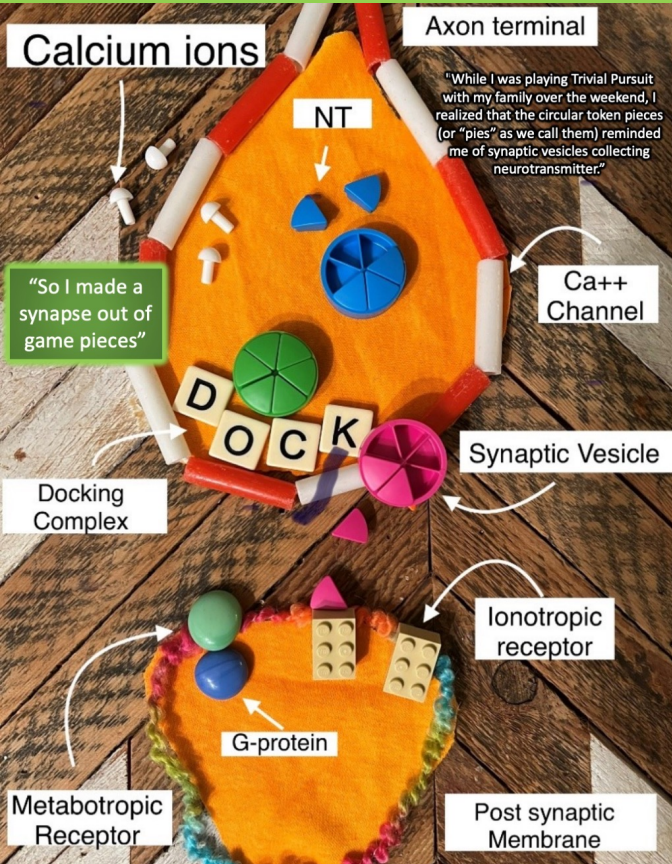
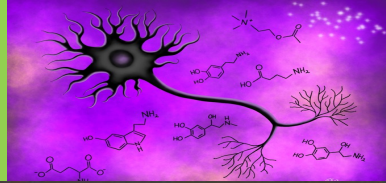


"I've always kind of thought the Soma of a neuron looked like a cracked open egg, which I spend a LOT of time looking at because I work at a cafe where we make a lot of egg sandwiches..."

#showusyourbraincell



# Make your own – AND SHARE!



#showusyourbraincell

Cris Keirsey @ Portland State University

#showusyourbraincell

