Letting Knowledge Serve through interdisciplinary neuroscience, art, and a few extra brains!

How do we inspire and learn from ALL our students? How do we inspire and learn from ALL in our community?

Noggin @ Kings
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 and Wyoming (UCross), and spent last month in 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 Grieser, Ph.D. is Senior Instructor 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 50,000 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.org
Arts integrated neuroscience outreach for K-12 & community

TEN YEARS!
ALL VOLUNTEER (everyone)
50,000+ community members
Art & Brains!

**NEURON**
- Myelin
- Nodes of Ranvier
- Axon
- Terminals
- Soma
- Axon hillock
- Dendrites

[nwnoggin.org]
What you do has relevance

GO PLACES
We all pay for research
Connections matter
Greater understanding
More support for research
Increased participation
Less confirmation bias
New directions
FUN!
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

Build your own mouse line!
To see other people

Researchers
Clinicians
Policy makers
Houseless youth

HOMELESSNESS & THE BRAIN

Thurs, Oct 19th
10am - 1pm

p:ear

Bunny: "we are all connected"

p:ear mentor gallery
338 NW 6th Ave
nwnoggin.org pearmentor.org
Rural Outreach

TO GO PLACES!

Siletz, Amity & Willamina, OR
Pop: 4,000

Davenport, WA
Pop: 1,700

Meservy Meadows, OR
Pop: ~40

La Grande, OR
Pop: 13,000

Heppner & Ione, OR
Pop: 1,240

Food, housing, baby goats...
Noggin + TRIO

NOGGINS ON THE OREGON COAST

The Stand, Seaside
nwnoggin.org

Rosebriar Mansion, Astoria

Fort George Brewery, Astoria

Astoria Coop

Clatsop Community College TRIO Program

Community Connections

October 4–7, 2021

Noggins on the Coast

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

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

#outreach #allvolunteer ❤️

“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?”

“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-

“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-
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 Keefer on January 24, 2019

MacLaren Youth Correctional Facility
At SfN conferences

Posters, art of neuroscience and ...
School visits

Turner Elementary, DC

Public outreach and connection
And also, in the U.S., to Capitol Hill

More connections: Congressional office visits
Congressional Neuroscience/STEAM briefing

“Bipartisan” neuron

Research should inform policy
NOGGINFEST!
Music, art, research, FREE
Britta Harbury, PSU undergraduate

Neurotransmitter escaping vesicle!
Sienna Morris
Artist/PSU transfer student

I had THE BEST time volunteering with @nwnoggin today.
Interdisciplinary presentation about how self care can change a depressed brain.
Making connections 4 years later...

Talking about the brain in ways that can help people on their journey to recovery was deeply rewarding. I think we helped a little yesterday and I’m so grateful to have been a part of that.

...This experience was my first time working among my peers as a student. I restarted school during the pandemic so I haven’t had the chance to connect with other students with similar interests. I can see what I’m missing and it makes me all that more excited to start at the university next year.
The neuron
nwnoggin.org

Axon
Axon terminals

Dendrites

Cell body (soma, perikaryon)

MAKE YOUR OWN: Details @ 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!
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)
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

Dendrites

Cell body (or soma)

Axon

Axon Terminals

From Plage des Chevrets in St. Coulomb in Northern Brittany, France

By Leigh Wilson, Kings College London
Tuna Jig Neuron

Axon (rolled up shrimp netting)

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.

Cell Body (lure for salmon trolling)

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

Dendrites (tuna jigs)

Axon terminals (tuna jigs)

LEARN MORE: https://oregonsea grant.edu

By Amanda Gladics, Oregon Sea Grant, OSU

#showusyourbraincell

Serootonin Flow

Astrocyte

Neuron cell body

Dendrite

Axon

Astrocyte

By Sai Kiersarsky

#showusyourbraincell
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”

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nwnoggin.org
Neuron from the coat rack

Soma

Axon

Dendrites

Axon Terminals

Fall Neuron

Dendrites

Cell membrane

Cell body

Dendrites

Soma

Nucleus

Myelin

Axon hillock

Axon

Axon collateral

Axon terminals

Schwann cell

Nodal segments

Synaptic vesicles

#showusyourbraincell

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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.

#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 & pressed 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

Axon Terminals

Chemicals in tear gas cause and worsen respiratory ailments

Portand Police Bureau officers used force "more than 6,000 times" during "crowd-control events" from 5/29 – 11/15.

-U.S. Department of Justice

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NEOCORTEX

From straw bales in Union County, Oregon

Surface of neocortex

Layer I

Layer II

Layer III

Layer IV

Layer V

Layer VI

Cortical minicolumn

A basic, repeated structural & functional unit of the neocortex.

Output to other cortical areas

Axonal inputs to cortex (from thalamus, other areas of cortex)

Most synapses made in Layer IV

Output to subcortical structures (thalamus, basal ganglia, etc)

White matter axons entering and leaving cortex

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You can find neurons everywhere!

#showusyourbraincell

**Dendrites!**
Receive input from other neurons at gaps called synapses

**Axon**
Carries electric message (action potential)

**Axon terminal**
Release of neurotransmitter

**Axon hillock**
Initiation site for electric message

**Cell body (or soma)**
Important for cell upkeep; Location of nucleus, and DNA

nwnoggin.org
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...”

Dendrites  Axon  Synapses
Cell body  Nucleus  Axon terminals

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.

Victoria Peterson, Portland State University

“Turtles are always kind of like a cracked open egg, which I spent 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

Calcium ions
Axon terminal
NT
Ca++ Channel
Synaptic Vesicle
Docking Complex
G-protein
Post synaptic Membrane

"So I made a synapse out of game pieces"

Docking Complex
Synaptic Vesicle
G-protein
Post synaptic Membrane

"While I was playing Trivial Pursuit with my family over the weekend, I realized that the circular token pieces (or "desks", as we call them) reminded me of synaptic vesicles collecting neurotransmitters."

Dendrites
Myelin sheath
Axon
Soma
Node of Ranvier
Synaptic terminals

Neuron

#showusyourbraincell