

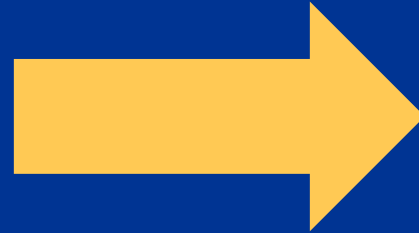
# Best Practices for High Impact Scholarly Presentations

Department of Anesthesiology  
& Perioperative Medicine  
Faculty Development Series

11/22/2022

Keith M. Vogt, MD, PhD, FASA

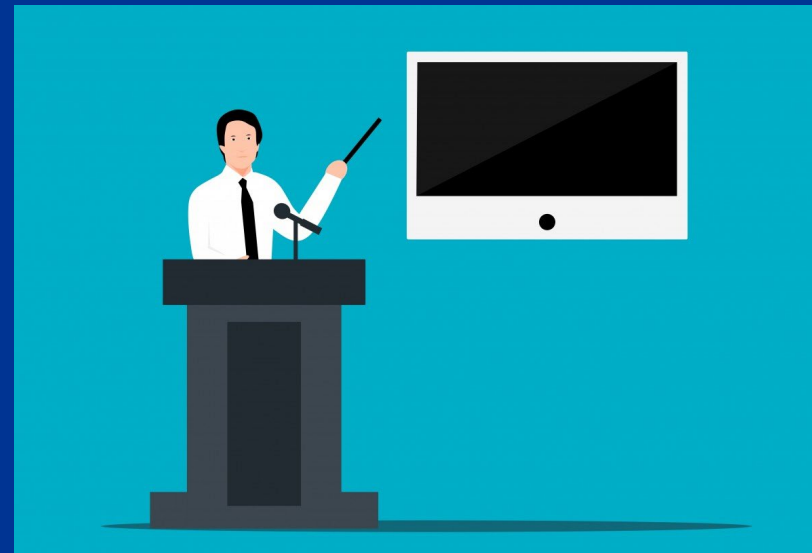
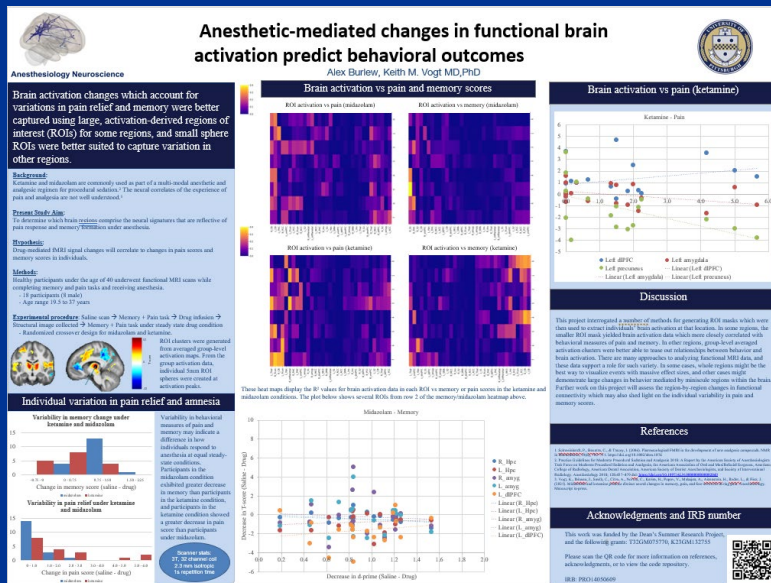
# How do I make my presentations awesome?



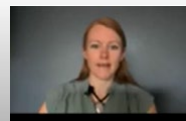


# Goal: Share (my) recommendations for best practices when presenting at a professional meeting

## Including....



## Machine Learning 101 for Anesthesiologists



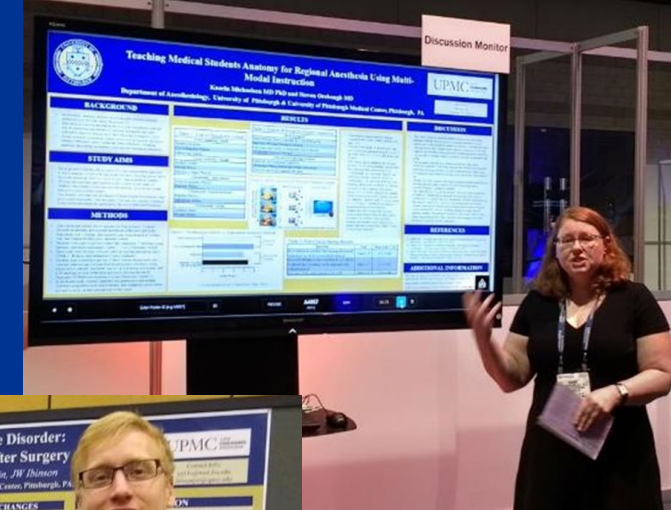
Dr. Hannah Lonsdale

# Poster Presentations





# Poster Preparation Tips

- Create in PowerPoint
- Don't waste space
- Focus on figures & tables
- Use bullet points
- Use large font
- **Highlight:** Summary & Key Points



# Poster templates are available (should be on SharePoint)

		<b>TITLE</b>	
		<b>AUTHORS</b> Affiliations	
<b>INTRODUCTION</b> This is where the introduction goes.	<b>MAIN DIAGNOSES/INTERVENTIONS</b> <ul style="list-style-type: none"><li>This is where main findings/interventions go</li></ul>	<b>OUTCOME/SUMMARY</b> <ul style="list-style-type: none"><li>This is where the summary goes.</li></ul>	
<b>CLINICAL FINDINGS</b> <ul style="list-style-type: none"><li>This is where clinical findings go.</li></ul>	<b>FIGURES/IMAGES</b> <ul style="list-style-type: none"><li>This is where figures/images/tables go</li></ul>		
		<b>REFERENCES</b> <small>1. This is where the references go.</small>	
		<b>ACKNOWLEDGEMENTS</b> This is where the acknowledgements go.	

# The #BetterPoster “movement” advocates for less content

#betterposter

How to create a better research poster in less time (including templates)

323,739 views • Mar 25, 2019

6.8K 145



**Mike Morrison**  
1.43K subscribers



**MICHIGAN STATE UNIVERSITY**

**Department of Psychology**  
College of Social Science

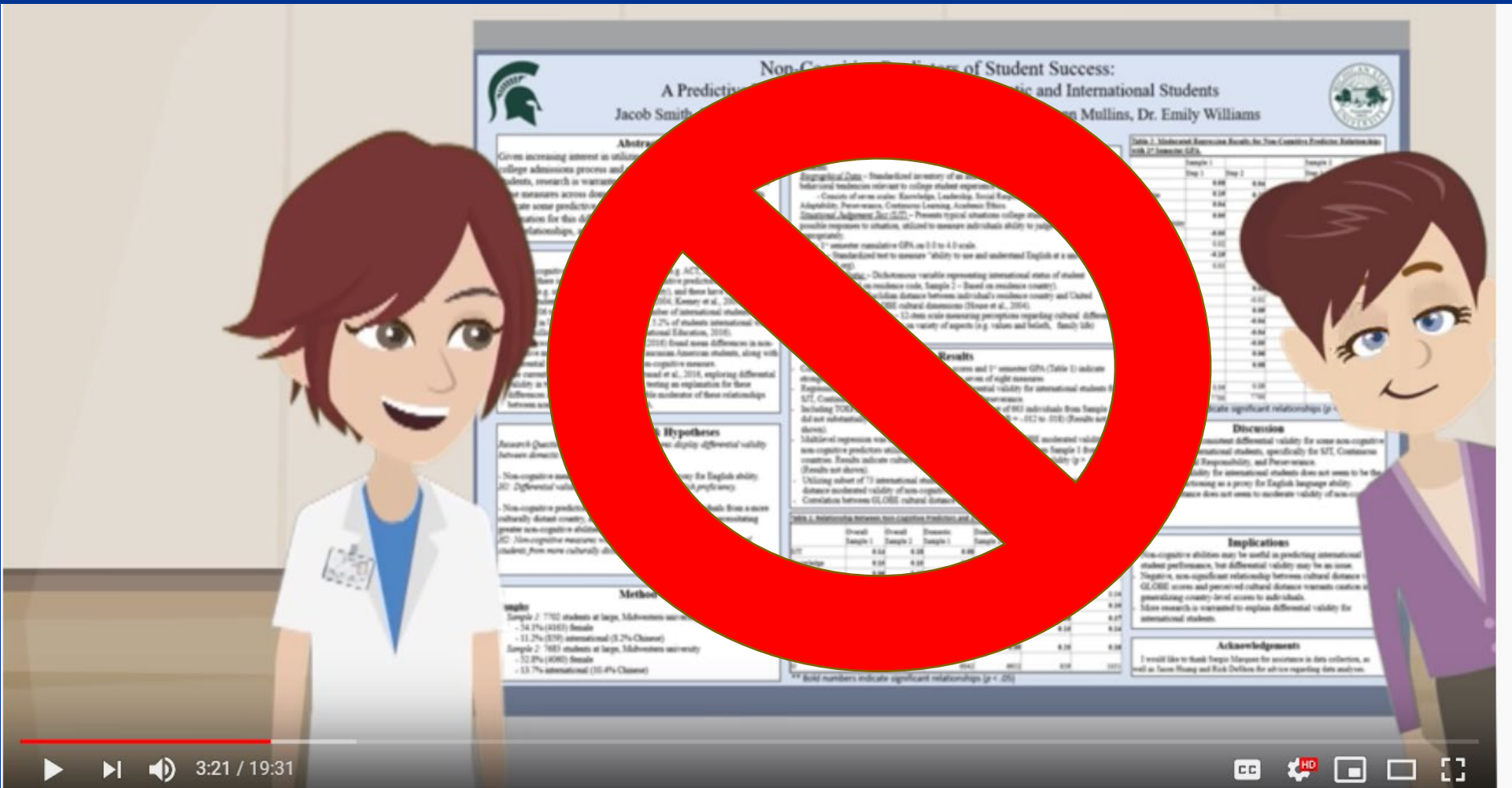
Template here: <https://osf.io/ef53g/> | Examples on Twitter: <https://twitter.com/mikemorrison>

Every field in science uses the same, old, wall-of-text poster design. If we can improve the knowledge transfer efficiency of that design even by a little bit, it could have massive ripple effects on all of science.

Also, poster sessions tend to suck, so here's my pitch to make them more efficient AND more fun with a new approach to designing scientific posters/academic posters that is both more usable, and easier to create!



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<https://www.youtube.com/watch?v=1RwJbhkCA58>

# Non-Cognitive Predictors of Student Success: A Predictive Validity Comparison Between Domestic and International Students

Jacob Smith, Dr. Thea Schofield,  
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- Increasing interest in utilizing non-cognitive predictors in the college admissions process
- Rising enrollment of international students

## METHODS

- We compare the predictive validity of these measures across domestic and international students.
- Results indicate some predictive validity differences do exist and an explanation for this differential validity, as well as a moderator of these relationships, are tested.

## RESULTS

- Consistent differential validity for some non-cognitive measures for international students, specifically for SJT, Continuous Learning, Social Responsibility, and Perseverance.
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## DISCUSSION

- Non-cognitive abilities may be useful in predicting international student performance, but differential validity may be an issue.
- Negative, non-significant relationship between cultural distance via GLOBE scores and perceived cultural distance warrants caution in generalizing country-level scores to individuals.
- More research is warranted to explain differential validity for international students.

For international students, perseverance and a sense of social responsibility are extra important for predicting first-year GPA.



**Table 2. Moderated Regression Results for Non-Cognitive Predictive Relationships with 1<sup>st</sup>-Semester GPA.**

	Sample 1		Sample 2	
	Step 1	Step 2	Step 1	Step 2
SJT	0.08	0.04	0.02	0.04
Knowledge	0.19	0.22	0.17	0.20
Leadership	0.04	0.03	0.07	0.07
Social Responsibility	0.07	0.06	0.03	0.05
Adaptability	-0.05	-0.03	-0.03	-0.02
Perseverance	0.02	0.04	0.04	0.04
Learning	0.19	0.20	0.22	0.20
Academic Ethics	0.02	0.00	0.02	0.02
International Status		-0.15		-0.15
SJT x Int		0.04		0.06
Lead x Int		-0.02		0.04
Learn x Int		0.09		0.09
Know x Int		0.04		-0.02
Adapt x Int		-0.04		0.04
Per x Int		0.05		0.04
Prox x Int		0.04		0.07
Ethics x Int		0.08		0.04
R Squared	0.06	0.09	0.08	0.11
N	7702	7702	7670	7670

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**Method**

**Sample 1:** 7702 students at Iowa, Midwestern university  
 - 54.1% (4163) Domestic  
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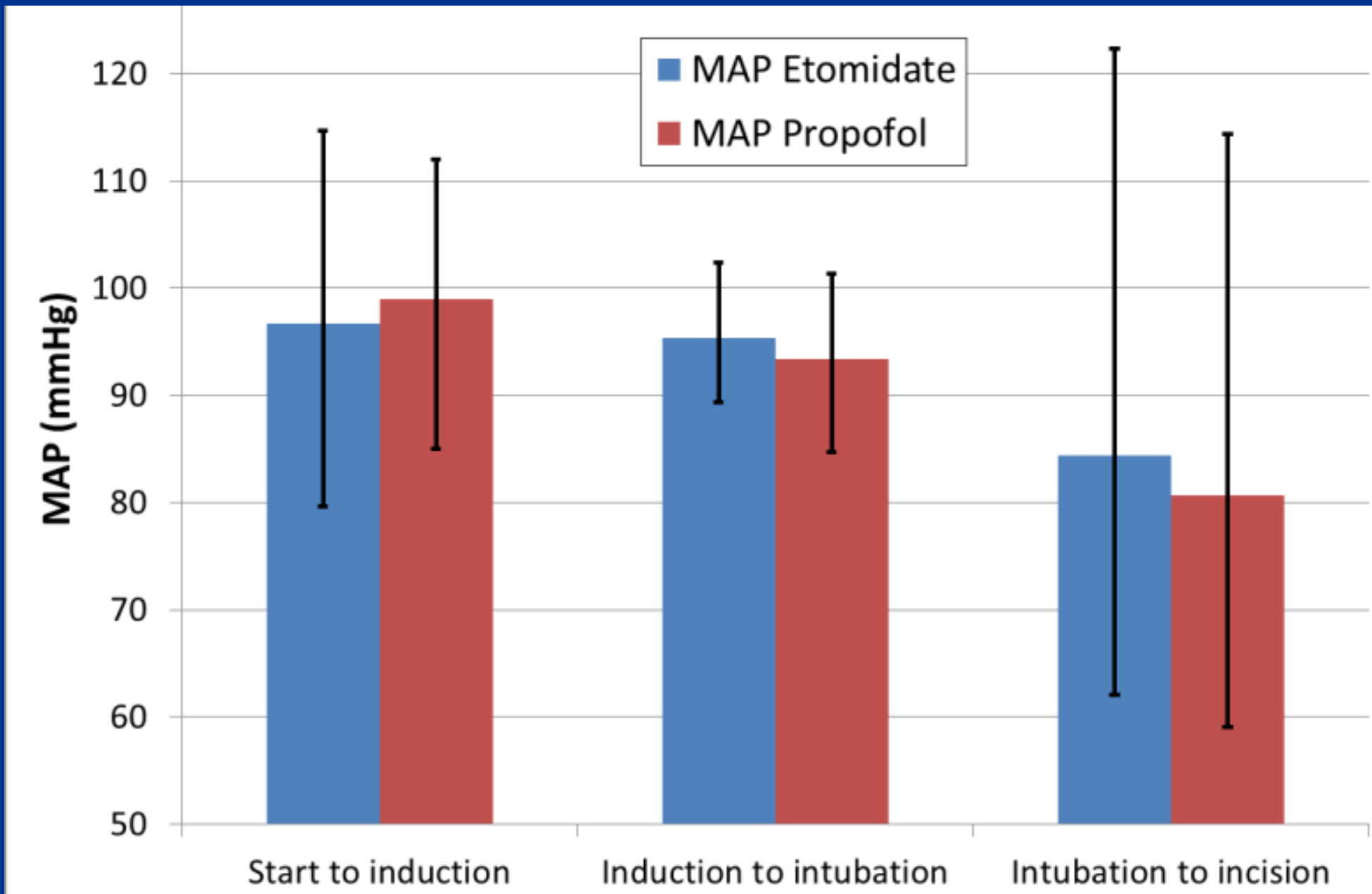


**Table 5. Summary of Intraoperative Systolic and Diastolic Blood Pressure Between the Propensity-Matched Groups** Anesth Analg 2013;117:1329–37

Time period	Systolic blood pressure				Diastolic blood pressure			
	Etomidate (N = 2144)	Propofol (N = 5233)	STD <sup>a</sup>	P	Etomidate (N = 2144)	Propofol (N = 5233)	STD <sup>a</sup>	P
Start case to induction								
Average	142 ± 27	145 ± 25	-0.10	<0.001	74 ± 17	76 ± 15	-0.12	<0.001
Minimum	115 ± 37	123 ± 32	-0.23	<0.001	62 ± 16	66 ± 15	-0.26	<0.001
Maximum	164 ± 32	162 ± 29	0.06	0.02	90 ± 33	87 ± 23	0.12	<0.001
Induction to intubation								
Average	146 ± 31	138 ± 30	0.26	<0.001	70 ± 16	71 ± 16	-0.03	0.29
Minimum	136 ± 33	124 ± 36	0.34	<0.001	66 ± 16	65 ± 17	0.02	0.43
Maximum	155 ± 33	150 ± 32	0.14	<0.001	76 ± 22	77 ± 19	-0.02	0.42
Intubation to incision								
Average	127 ± 22	118 ± 20	0.47	<0.001	63 ± 12	62 ± 11	0.11	<0.001
Minimum	92 ± 24	83 ± 22	0.38	<0.001	47 ± 11	47 ± 11	0.06	0.02
Maximum	175 ± 34	161 ± 33	0.40	<0.001	96 ± 34	91 ± 32	0.15	<0.001
Incision to closing								
Average	123 ± 17	121 ± 16	0.12	<0.001	62 ± 10	63 ± 10	-0.14	<0.001
Minimum	89 ± 19	87 ± 17	0.12	<0.001	46 ± 10	47 ± 9	-0.09	0.001
Maximum	173 ± 35	168 ± 35	0.15	<0.001	110 ± 52	104 ± 47	0.11	<0.001
Closing to emergence								
Average	124 ± 19	122 ± 19	0.12	<0.001	61 ± 11	63 ± 11	-0.17	<0.001
Minimum	108 ± 20	106 ± 20	0.08	0.02	53 ± 11	55 ± 12	-0.19	<0.001
Maximum	145 ± 27	141 ± 27	0.12	<0.001	73 ± 22	75 ± 23	-0.07	0.03
Emergence to end case								
Average	142 ± 24	140 ± 24	0.06	0.05	69 ± 14	71 ± 14	-0.16	<0.001
Minimum	118 ± 26	118 ± 25	0.01	0.84	56 ± 14	59 ± 13	-0.22	<0.001
Maximum	164 ± 30	161 ± 30	0.10	0.001	86 ± 30	86 ± 26	0.01	0.76

<sup>a</sup>Standardized differences (STDs) (etomidate – propofol): the difference in proportions divided by the pooled standard deviation; >0.10 in absolute value indicates slight different.





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Perseverance	0.02	0.04	0.04	0.04
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Academic Ethics	0.02	0.00	0.02	0.01
International Status		-0.15		-0.15
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Lead x Int		-0.01		0.04
Learn x Int		0.09		0.09
Know x Int		0.04		-0.02
Adapt x Int		-0.04		0.04
Per x Int		0.05		0.04
Ethics x Int		0.04		0.07
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Adaptability	-0.04	-0.07	-0.05	-0.01
Perseverance	0.01	0.02	0.02	0.04
Learning	0.19	0.19	0.19	0.17
Academic Ethics	0.02	0.02	0.07	0.02
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<sup>1</sup>Department of Anesthesiology; <sup>2</sup>Pittsburgh Center for Pain Research  
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UPMC LIFE CHANGING MEDICINE

International Anesthesia Research Society  
Annual Meeting - May 2014

## SUMMARY

The portion of the insula chosen as the seed region for functional connectivity MRI (fcMRI) analysis dramatically affects the resulting maps. This is particularly important when comparing maps obtained during rest to those during experimental pain. In this study, the posterior insula is a seed region that can differentiate the experience of acute pain from rest.

## fcMRI METHODOLOGY

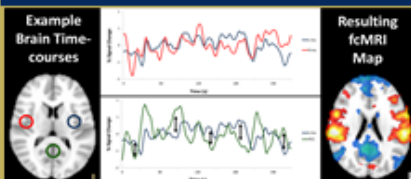


Fig. 1. Using the left insula (L-Ins) as the seed, areas of correlation (red-yellow) such as the right insula (R-Ins) and areas of anti-correlation (blue-green) such as the posterior cingulate cortex (PCC) are identified.

## BACKGROUND

- The insula plays a key role in pain processing.<sup>1</sup>
- fcMRI during painful and innocuous thermal stimulation demonstrated anatomically different connectivity.<sup>2</sup>
- The anterior insula (aIns) was more correlated to the anterior cingulate cortex (ACC).
- The posterior insula (pIns) was more correlated to the primary somatosensory (S1) and motor (M1) cortices.
- Our work<sup>3,4,5</sup> optimizing fcMRI analysis showed increased pIns connectivity to the ACC during pain versus rest.

## STUDY AIMS

**Goal:** Directly compare fcMRI maps between rest and experimental pain for seed regions in the left (contralateral) anterior and posterior insula.

**Hypothesis:** Increased insula-ACC connectivity would be seen during pain processing, and this difference would be greater for the anterior compared to the posterior insula.

## METHODS

- 3 T BOLD data was acquired in 14 healthy adults during REST and while painful ENS (PAIN), self-rated as 7/10, was delivered to the right index finger.
- Seed time courses for the contralateral aIns and pIns were extracted from the anatomic locations shown in Fig. 2.
- Functional connectivity was determined for both seed regions in both data sets using FSL 5.0 (<http://www.fmrib.ox.ac.uk>).
- An optimized analysis pipeline was used, including low pass filtering, spatial smoothing, and regression of the global signal,<sup>6</sup> motion parameters, and the pain stimulation<sup>4</sup> as effects of no interest.
- Group average maps, including anti-correlations,<sup>7</sup> and PAIN vs. REST difference maps were generated with thresholds  $Z > 4$  and  $p < 0.0001$ .



Fig. 2. Oblique slice through the insula showing the locations of the anterior and posterior seed regions for the functional connectivity analysis.

## RESULTS

- Group average functional connectivity maps for the **left insula seeds** (Fig. 3) show:
  - The aIns was correlated to the ACC in both REST and PAIN.
  - The pIns was correlated to the ACC in REST only.
  - Both aIns and pIns were correlated to the right insula in both REST and PAIN.
  - Both aIns and pIns were correlated to S1 and M1 bilaterally in both PAIN and REST.
  - The pIns was anti-correlated to the posterior cingulate cortex during REST.
- The difference maps (Fig. 4) show almost no statistically significant PAIN vs. REST differences in aIns connectivity:
  - The pIns showed differential connectivity between the painful and non-painful states:
    - Connectivity was stronger to the ACC and right insula in REST compared to PAIN.
    - Connectivity was stronger to the PCC in PAIN compared to REST.

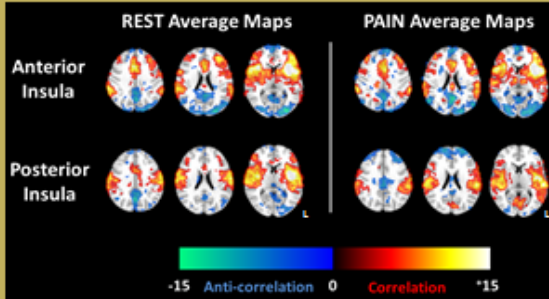


Fig. 3. Group average functional connectivity maps, in radiologic orientation, with color bar showing Z-scores of significant correlations (red-yellow) or anti-correlations (blue-green) to the two left insula seed regions.

## PAIN vs. REST Connectivity Difference Maps

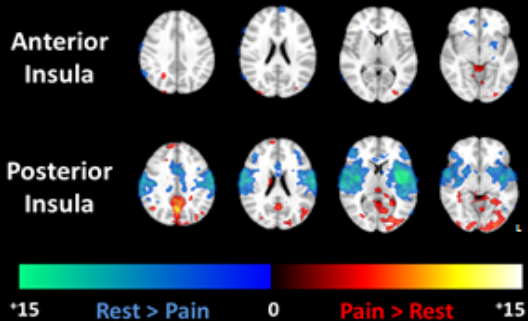


Fig. 4. Maps, in radiologic orientation, of significant connectivity differences for the Pain > Rest (red-yellow) and Rest > Pain (blue-green) comparisons, with Z-scores as shown on the color bar.

## DISCUSSION

- This study comparing fcMRI between resting-state and the experience of pain showed:
  - Insula connectivity includes areas involved in pain processing such as the ACC, as well as the PCC, part of the default mode network.
  - Anterior insula connectivity is similar between PAIN and REST.
  - The posterior insula showed dynamic connectivity changes between PAIN and REST.
- The interpretations of insular functional connectivity differences between the PAIN and REST conditions would be completely different if the anterior or posterior portions were examined in isolation.

## CONCLUSIONS

- The choice of a anatomic seed region in fcMRI analysis has a dramatic effect on the resulting connectivity maps.
- The posterior insula is a putative site for differentiating between the presence or absence of acute ENS pain.

## REFERENCES

- Aptarian AV, et al. Human brain mechanisms of pain perception and regulation in health and disease. *Eur J Pain* 2005;9:463-84.
- Peltz E, et al. Functional connectivity of the human insular cortex during nocuous and innocuous thermal stimulation. *NeuroImage* 2011;54:1324-35.
- Taylor K, et al. A Study of the Functional Connectivity of the Insula and the Anterior Cingulate During Pain Processing. *Anesth Analg* 2013;116:8-219.
- Ibinson JW, Vogt KM. fcMRI maps during pain tasks vary based on the inclusion of paradigm modeling in analysis. *J Pain* 2014;15:857.
- Ibinson JW, Vogt KM. Effect of anti-correlations on statistical comparisons between pain task and resting fcMRI datasets. *J Pain* 2014;15:858.

## ADDITIONAL INFORMATION

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James Ibinson: [ibinsonjw@upmc.edu](mailto:ibinsonjw@upmc.edu)



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UPMC LIFE CHANGING MEDICINE



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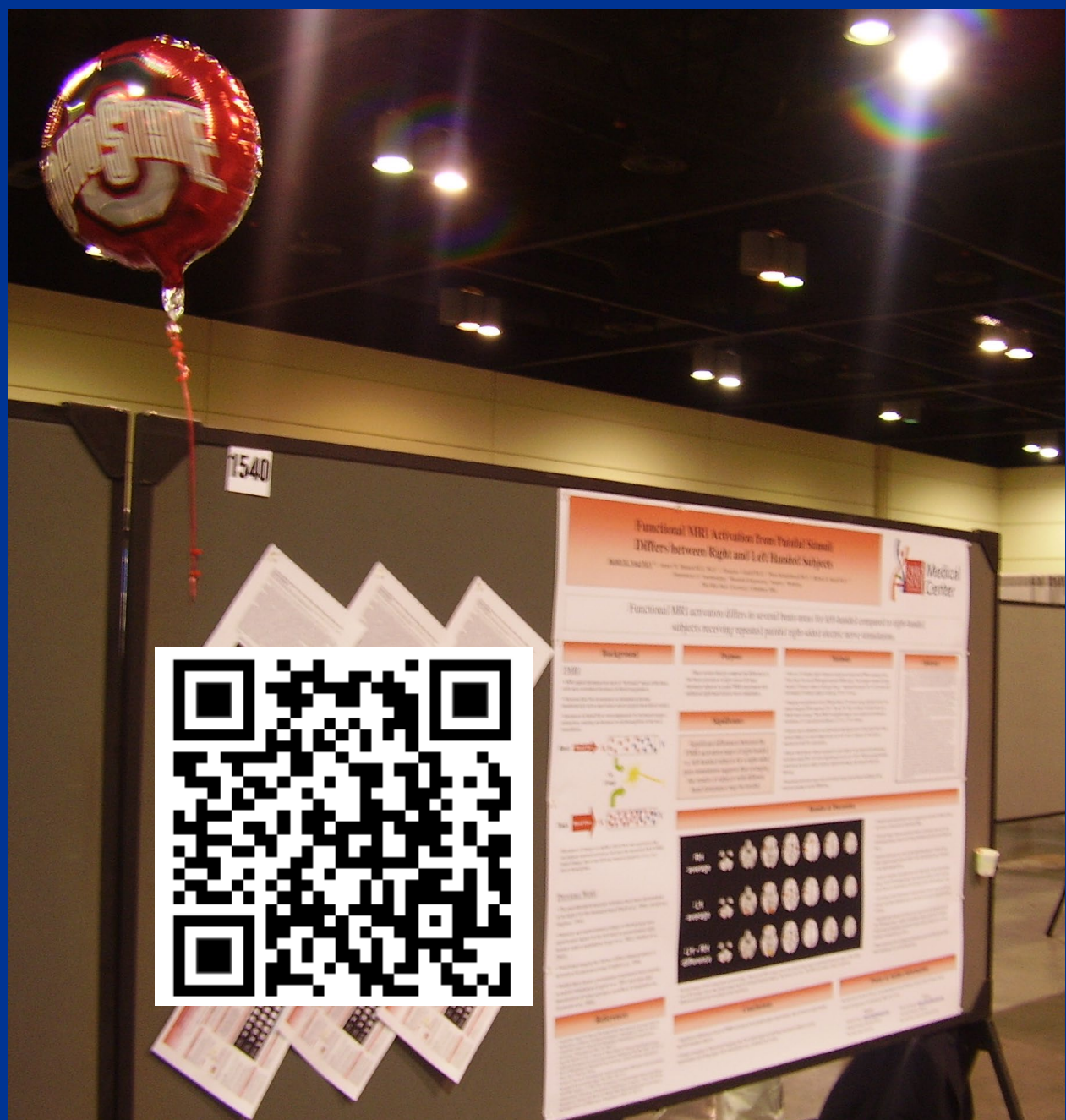
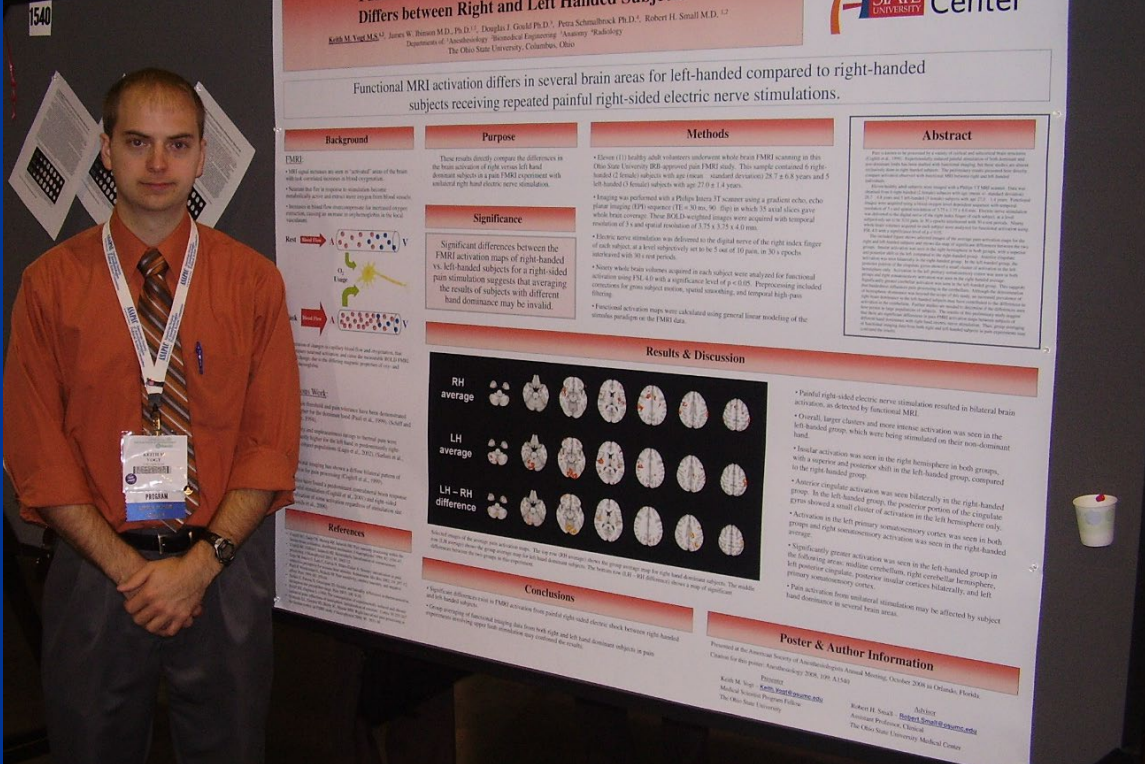
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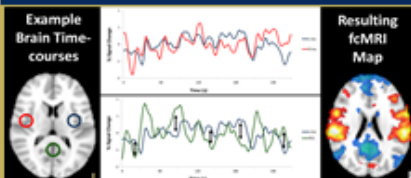


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- 3 T BOLD data was acquired in 14 healthy adults during REST and while painful ENS (PAIN), delivered at 7/10, was delivered to the right index finger.
- Seed time courses for the contralateral aIns and pIns were extracted from the anatomic locations shown in Fig. 2.
- Functional connectivity was determined for both seed regions in both data sets using FSL 5.0 ([www.fmrib.ox.ac.uk](http://www.fmrib.ox.ac.uk)).
- An optimized analysis pipeline was used, including low pass filtering, spatial smoothing, and regression of the global signal,<sup>6</sup> motion parameters, and the pain stimulation<sup>4</sup> as effects of no interest.
- Group average maps, including anti-correlations,<sup>7</sup> and PAIN vs. REST difference maps were generated with thresholds  $Z > 4$  and  $p < 0.0001$ .



Fig. 2. Oblique slice through the insula showing the locations of the anterior and posterior seed regions for the functional connectivity analysis.

## RESULTS

- Group average functional connectivity maps for the **left insula seeds** (Fig. 3) show:
  - The aIns was correlated to the ACC in both REST and PAIN.
  - The pIns was correlated to the ACC in REST only.
  - Both aIns and pIns were correlated to the right insula in both REST and PAIN.
  - Both aIns and pIns were correlated to S1 and M1 bilaterally in both PAIN and REST.
  - The pIns was anti-correlated to the posterior cingulate cortex during REST.
- The difference maps (Fig. 4) show almost no statistically significant PAIN vs. REST differences in aIns connectivity:
  - The pIns showed differential connectivity between the painful and non-painful states:
    - Connectivity was stronger to the ACC and right insula in REST compared to PAIN.
    - Connectivity was stronger to the PCC in PAIN compared to REST.

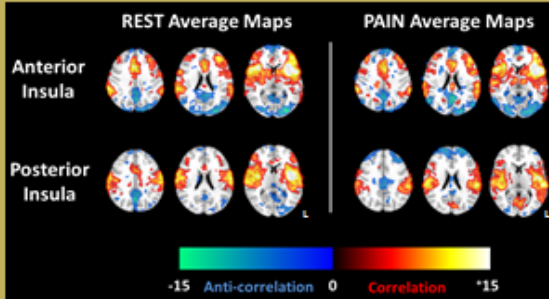


Fig. 3. Group average functional connectivity maps, in radiologic orientation, with color bar showing Z-scores of significant correlations (red-yellow) or anti-correlations (blue-green) to the two left insula seed regions.

## PAIN vs. REST Connectivity Difference Maps

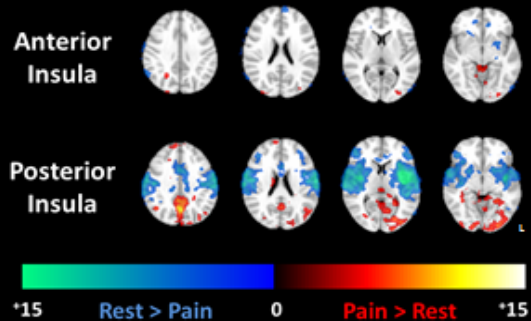


Fig. 4. Maps, in radiologic orientation, of significant connectivity differences for the Pain > Rest (red-yellow) and Rest > Pain (blue-green) comparisons, with Z-scores as shown on the color bar.

## DISCUSSION

- This study comparing fcMRI between resting-state and the experience of pain showed:
  - Insula connectivity includes areas involved in pain processing such as the ACC, as well as the PCC, part of the default mode network.
  - Anterior insula connectivity is similar between PAIN and REST.
  - The posterior insula showed dynamic connectivity changes between PAIN and REST.
- The interpretations of insular functional connectivity differences between the PAIN and REST conditions would be completely different if the anterior or posterior portions were examined in isolation.

## CONCLUSIONS

- The choice of a anatomic seed region in fcMRI analysis has a dramatic effect on the resulting connectivity maps.
- The posterior insula is a putative site for differentiating between the presence or absence of acute ENS pain.

## REFERENCES

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- Peltz E, et al. Functional connectivity of the human insular cortex during nocuous and innocuous thermal stimulation. *NeuroImage* 2011;54:1324-35.
- Taylor K, et al. A Study of the Functional Connectivity of the Insula and the Anterior Cingulate During Pain Processing. *Anesth Analg* 2013;116:8-229.
- Ibinson JW, Vogt KM. fcMRI maps during pain tasks vary based on the inclusion of paradigm modeling in analysis. *J Pain* 2014;15:857.
- Ibinson JW, Vogt KM. Effect of anti-correlations on statistical comparisons between pain task and resting fcMRI datasets. *J Pain* 2014;15:858.

## ADDITIONAL INFORMATION

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James Ibinson: [ibinsonjw@upmc.edu](mailto:ibinsonjw@upmc.edu)

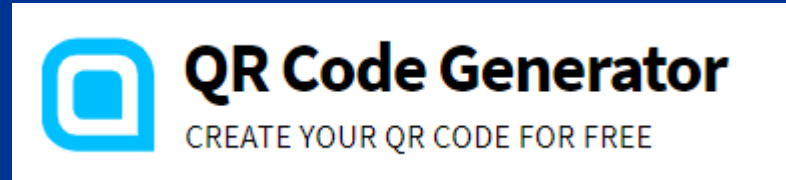


Funding Support by: NIH Grant Number R01NS080001, Department of Anesthesiology Seed Grant, and Grant Number SUL1 RR024153-04 from the National Center for Research Resources (NCRR, a component of the NIH), and NIH Roadmap for Medical Research.  
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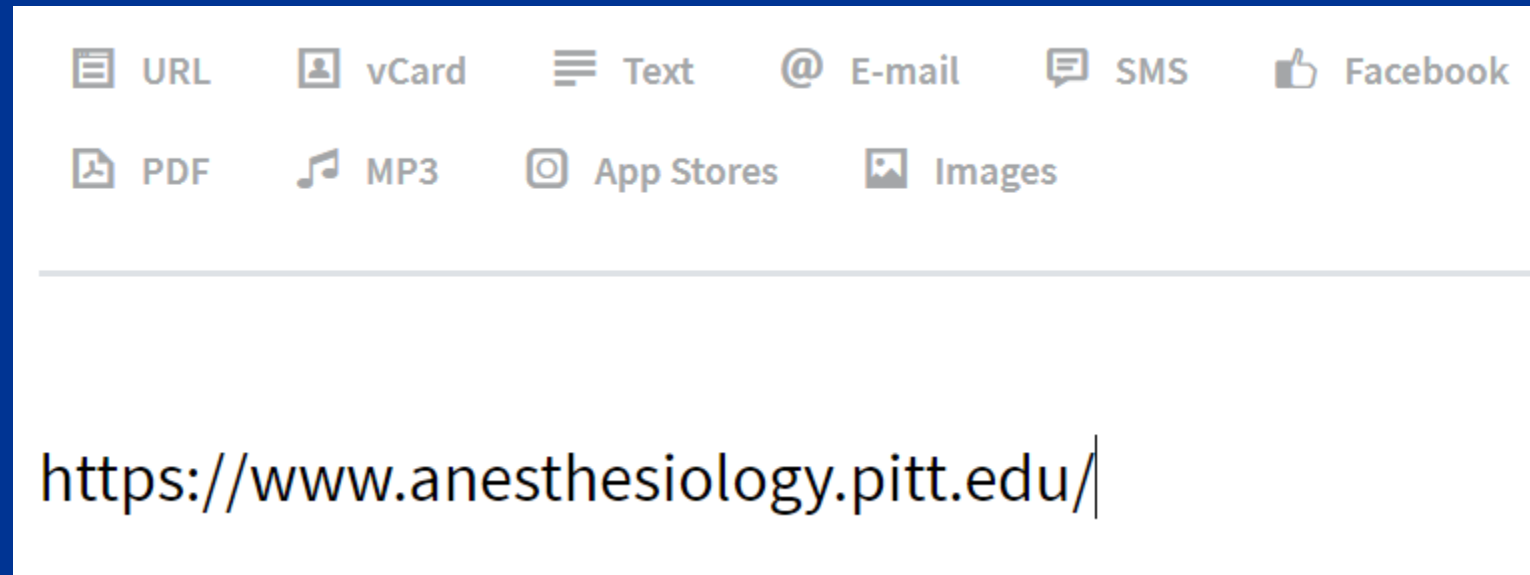




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# Keith M. Vogt, MD, PhD, FASA

Assistant Professor, Anesthesiology & Perioperative Medicine, Bioengineering, and Center for the Neural Basis of Cognition

Director, Pittsburgh ANesTHEsiology Research (PANTHER) track Program, UPMC Anesthesiology Residency Program

Co-director, Anesthesiology Professional Practice Rotation

Director, Center for Neuroscience Research



## Education & Training

- Youngstown State University, BE, Electrical Engineering
- The Ohio State University, MS, Biomedical Engineering
- The Ohio State University, PhD, Biomedical Engineering
- The Ohio State University School of Medicine, MD
- Riverside Methodist Hospital, Preliminary Medicine Internship
- UPMC, Anesthesiology Residency
- University of Pittsburgh, Department of Anesthesiology, T32 Postdoctoral Research Fellowship
- UPMC/University of Pittsburgh Joseph M. Katz Graduate School of Business, Marshall W. Webster Physician Leadership Program

## Representative Publications

Dr. Vogt's [publications](#) can be reviewed through the National Library of Medicine's publication database.

## Research, clinical, and/or academic interests

### Research Program

- Determining the neural effects of diverse anesthetics on memory formation and the experience of pain
- Development of functional connectivity MRI as a neurosignature for pain and cognitive vulnerability
- Use of perioperative data to predict/prevent adverse outcomes, with a particular interest in neurologic and psychiatric data/outcomes

Dr. Vogt's research broadly applies bioengineering principles to better understand human neuroscience relevant to anesthesiology and perioperative medicine. The focus of his currently-funded project is on how human memory is affected by sedation with diverse anesthetic agents while concomitantly experiencing painful stimulation. Specifically, his group is determining the neural correlates of successful memory encoding during drug-induced sedation. He is further examining what physiologic measurements could reveal a learned sympathetic response to aversive stimuli, despite no explicit recollection of the event. This human experimental model is particularly relevant to the experience of surgery and anesthesia, where aversive experiences may be experienced with impaired contextualization. Dr. Vogt's research comparing midazolam and ketamine was a featured article in *Anesthesiology*, and his functional connectivity work was recognized with a best-in-category *Kosaka award* at the 2021 IARS annual meeting.

### Educational Interests

Dr. Vogt is strongly committed to advancing scholarly education during clinical training programs. He has helped develop the curriculum and continues to co-direct the novel *Anesthesiology Professional Practice rotation* for our PGY1 residents. Additionally, he directs the *Pittsburgh ANesTHEsiology Research (PANTHER) track* for training future physician scientists. He is committed to the mentorship of diverse graduate and medical trainees at all levels and supports faculty colleagues interested in advancement in academic medicine.

### Research Grants

- Foundation for Anesthesia Education and Research, Clinical/Translational Mentored Research Training Grant, 2017 - 2019
- National Institutes of Health, K23GM132755-01A1 (PI: Vogt), Anesthetic Modulation of Human Memory During Acute Pain, 2019-2023

Department of  
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## Michael Schnetz, MD, PhD

Assistant Professor

Coordinator, Data Sciences Research

### Education & Training

- Anesthesiology Residency, UPMC
- T32 Postdoctoral Research Fellowship, University of Pittsburgh Department of Anesthesiology and Perioperative Medicine
- MD, Case Western Reserve University School of Medicine



### Contact

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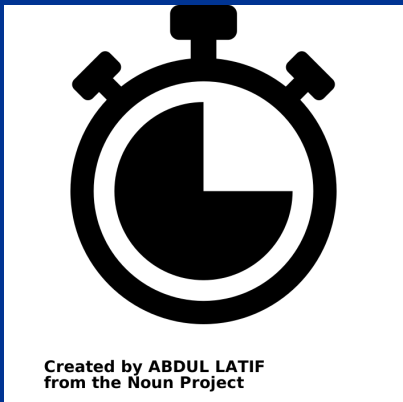


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# Successful oral presentations should:



Concisely summarize your work



Fit comfortably into the time allotted



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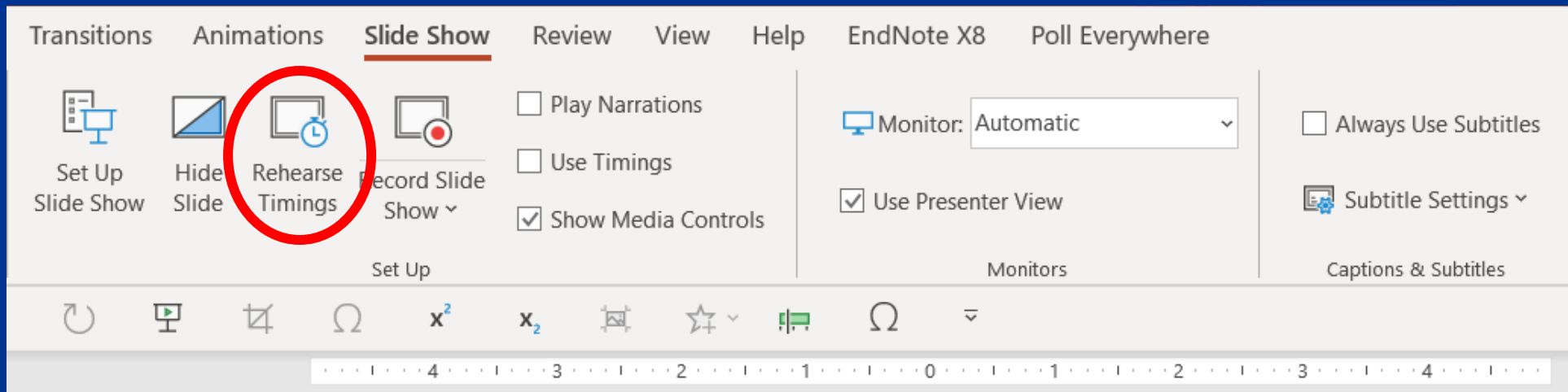
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My main advice:

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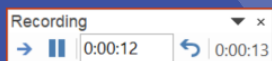
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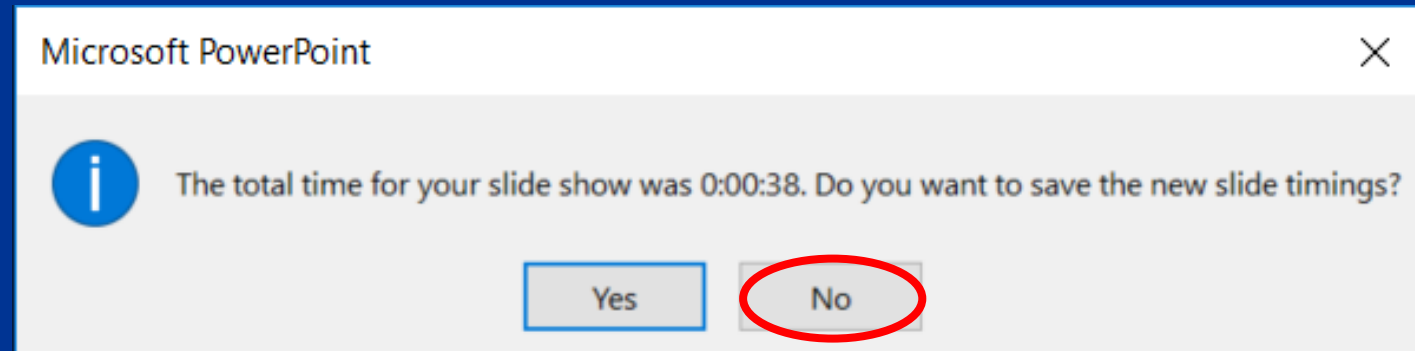
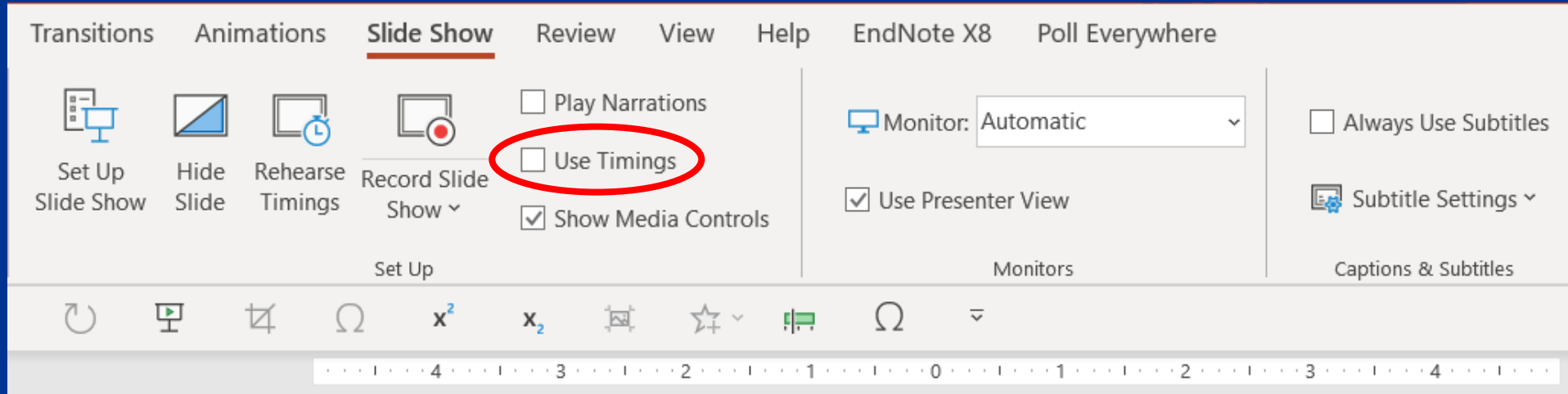
Keith M. Vogt, MD, PhD  
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- Provide compelling introduction →
- State hypothesis/aims →
- Figures and tables: →
  - Content should be obvious at a glance
  - Text should be minimal and readable
- Summarize with concise impactful conclusions →
- Generate excitement
- Frame your question
- Clearly explain findings
- Drive the point home

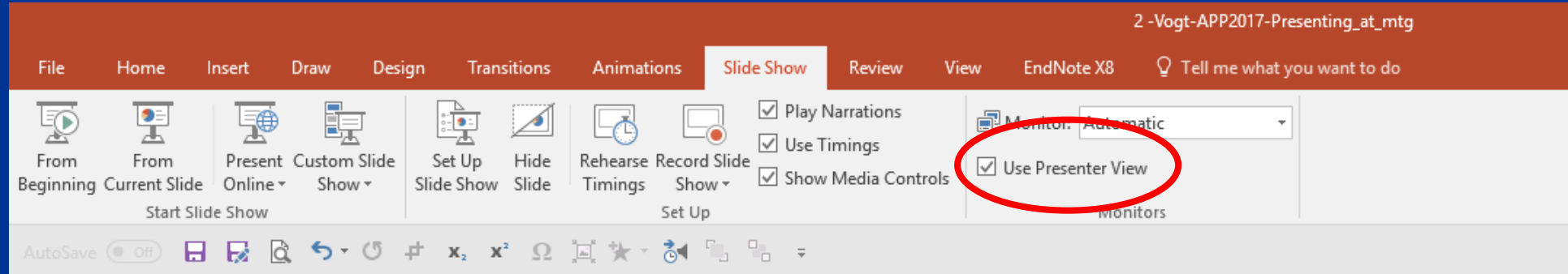




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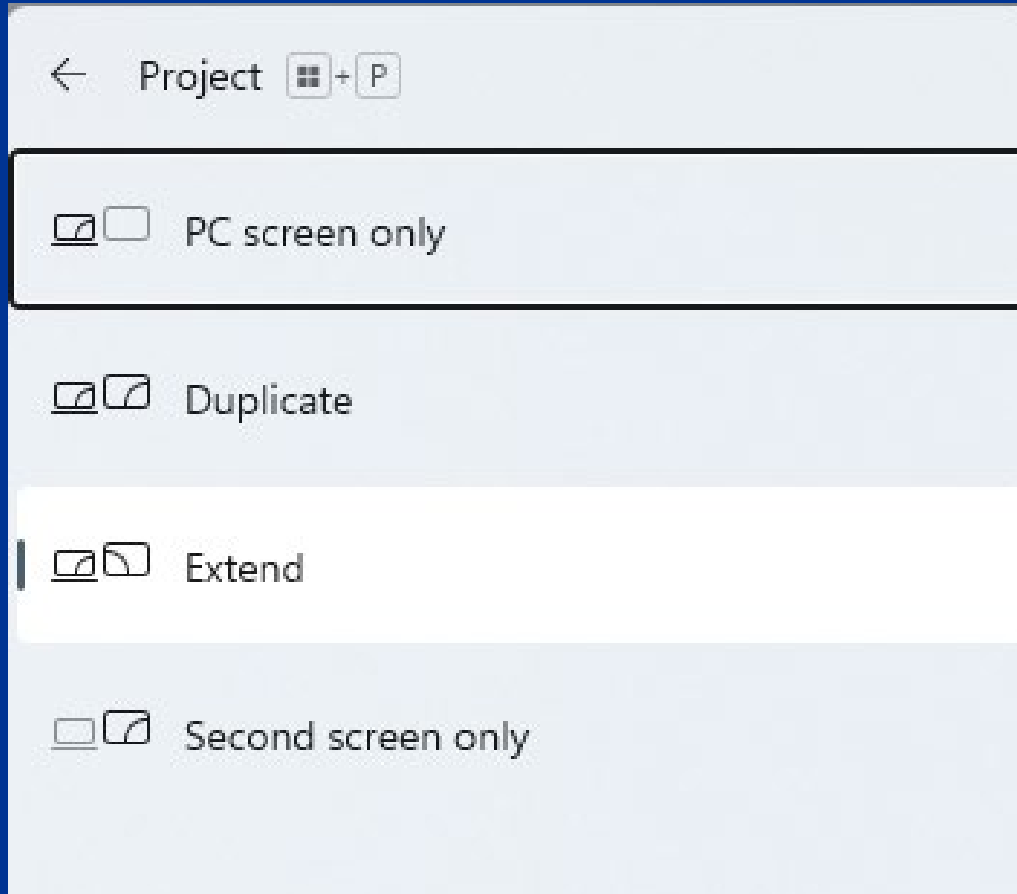


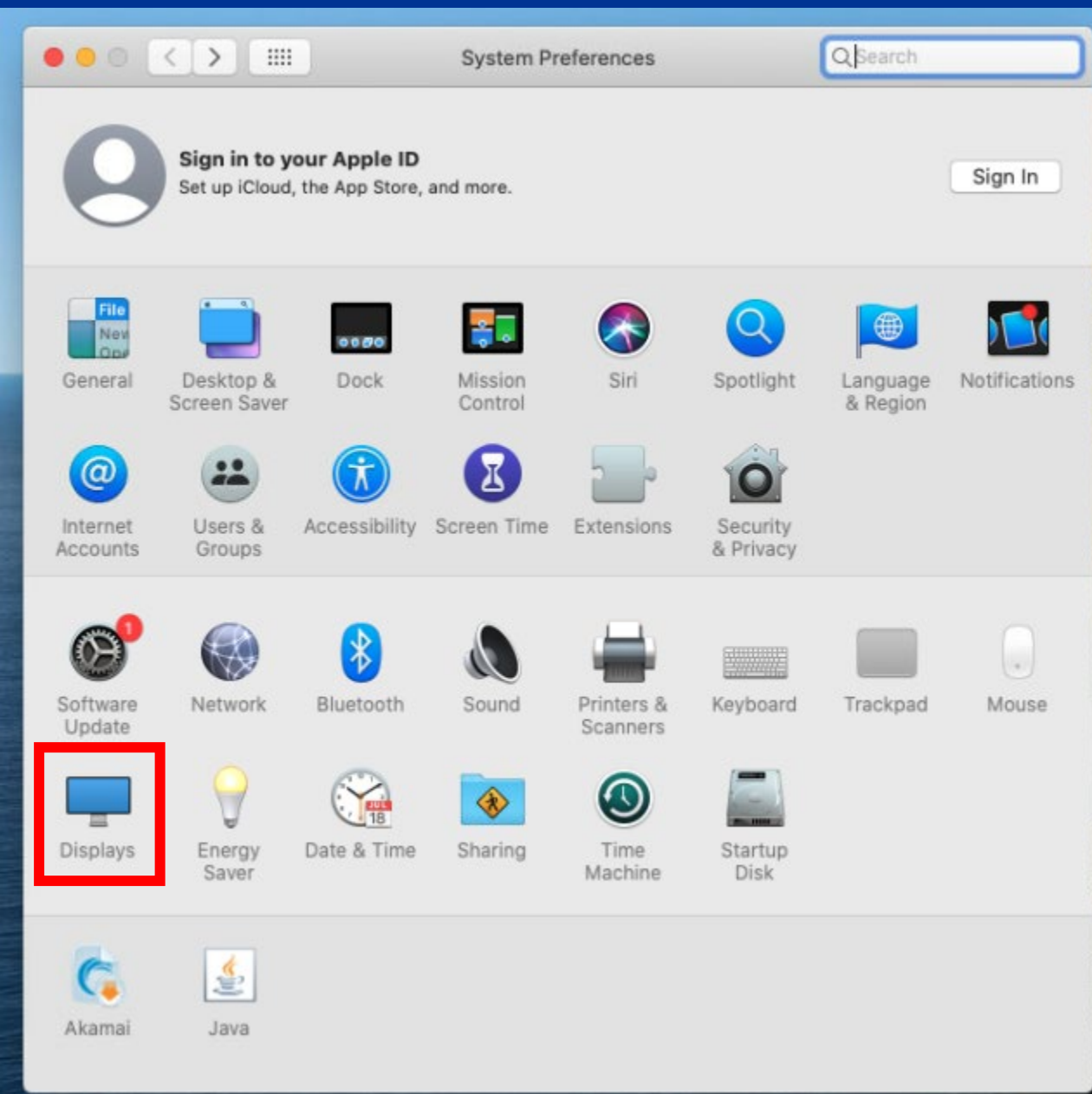
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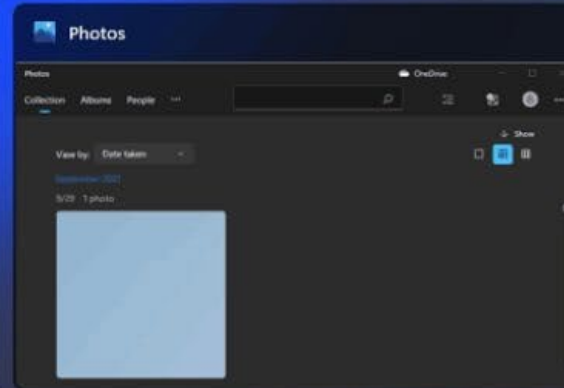
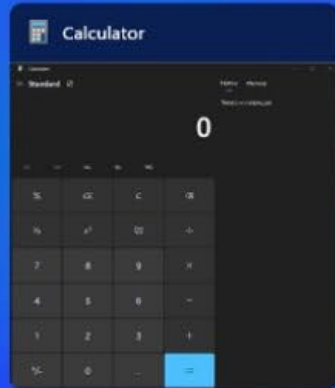
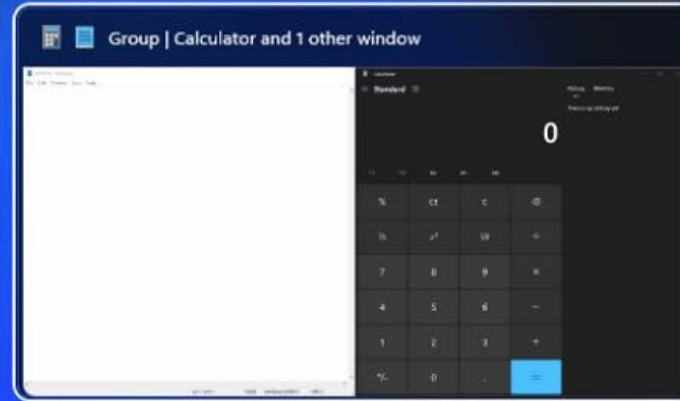
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# Presenting remotely has some unique considerations.

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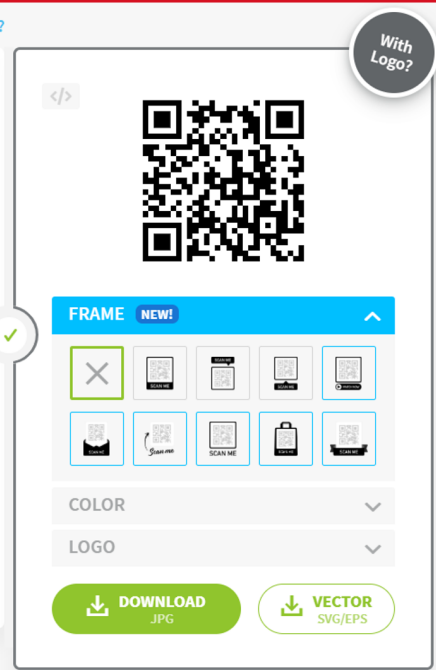
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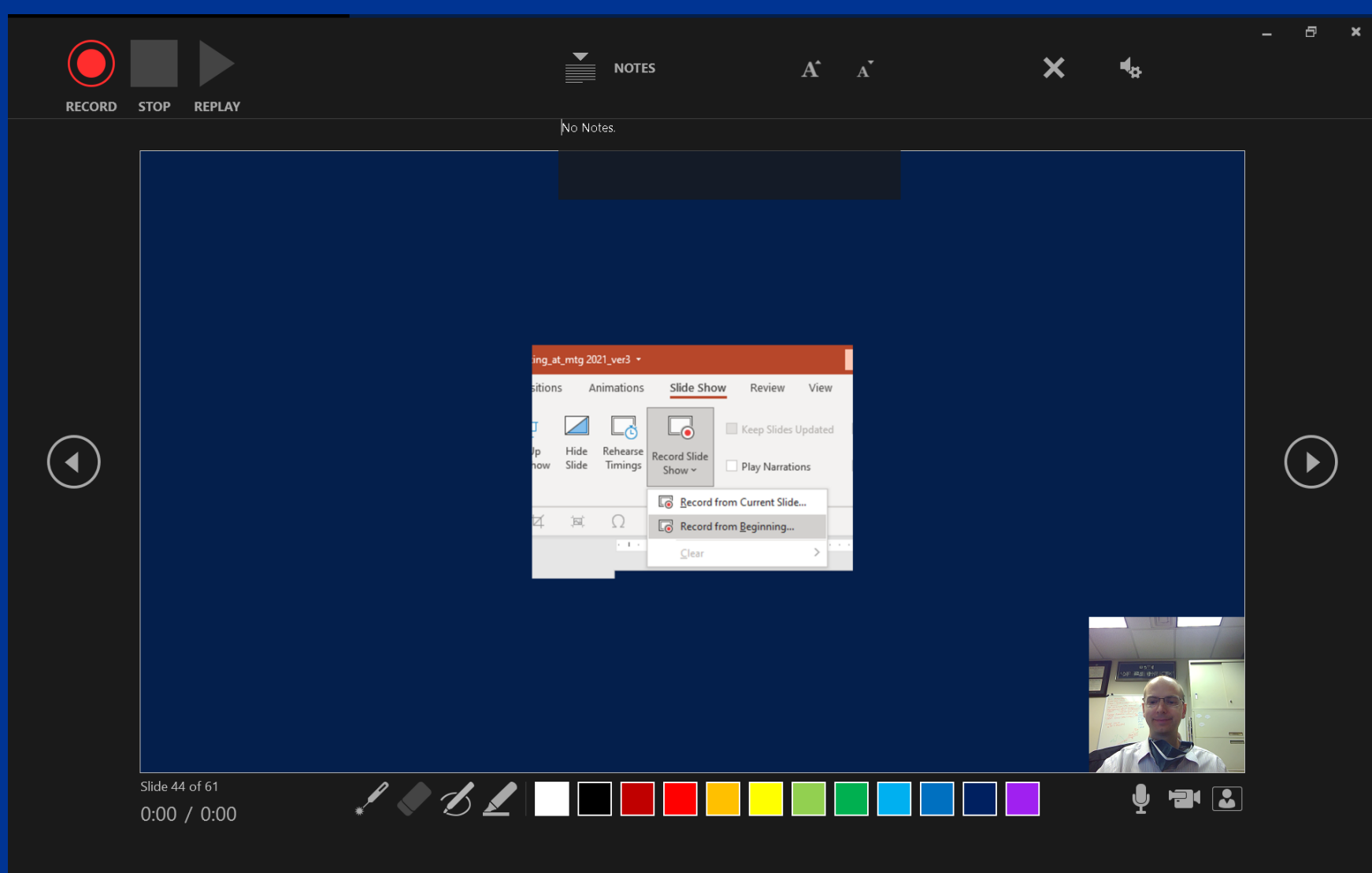
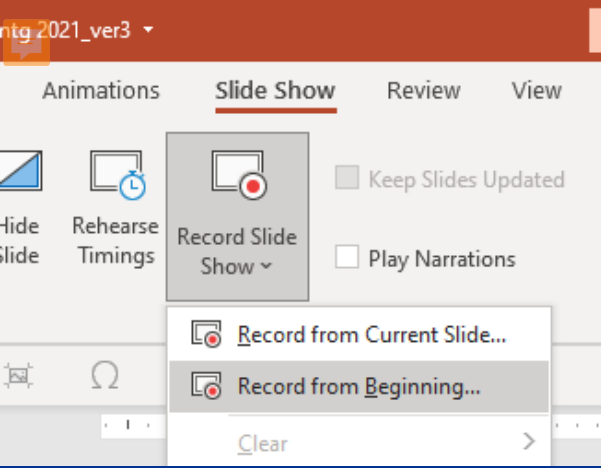
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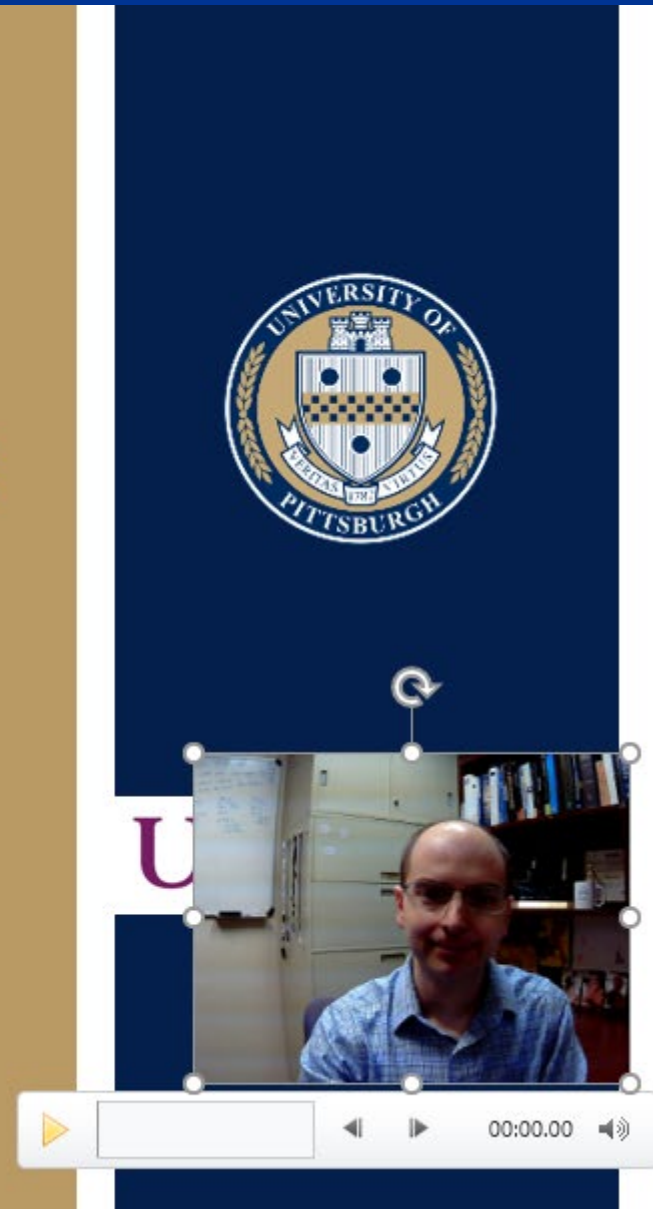
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# Forming the Question-1

- **P – Patient or Population:**
  - Patients undergoing CABG
- **I – Intervention:**
  - Estimated fibrinogen (FLEV) by ff-TEG ?
- **C – Comparison :**
  - Plasma Fibrinogen by Von Clauss Method(Gold standard)
- **O – Outcome :**
  - Do they correlate?

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CLARKE ET AL. THE PREVENTION OF CHRONIC POSTSURGICAL PAIN USING GABAPENTIN AND PREGABALIN: A COMBINED SYSTEMATIC REVIEW AND META-ANALYSIS. *ANESTHESIA & ANALGESIA* 2012; 115(2): 428-442.

- Systematic review, meta analysis
- Aim: Systematic review of published literature pertaining to prevention of chronic post surgical pain (CPSP) after perioperative administration of gabapentin and pregabalin.
- 11 studies (8 gabapentin, 3 pregabalin). Total 930 pts included in trials (755 gabapentin, 175 pregabalin). Sample sizes ranged from n = 30 to n = 240, median n = 50.
- Surgical types included: breast, total knee arthroplasty, total hip arthroplasty, caesarean, thyroidectomy, cardiac surgery, lumbar discectomy, inguinal herniorraphy, abdominal hysterectomy.
- Methods: Gabapentin dosing: 3 studies single preop dose 1200 mg, 2 600 mg; rest 1200 mg qD x 8-10 days or 300 mg x10 days. Pregabalin dosing: 2 studies 300 mg preop dose, either continued for 2 more doses or 50-150 mg qD x14d. 1 gave preop dose 150 mg plus 75 mg qD x5 days.
- Outcomes: Pain scores 3, 6 mos and disability assessment 3, 6 mos.



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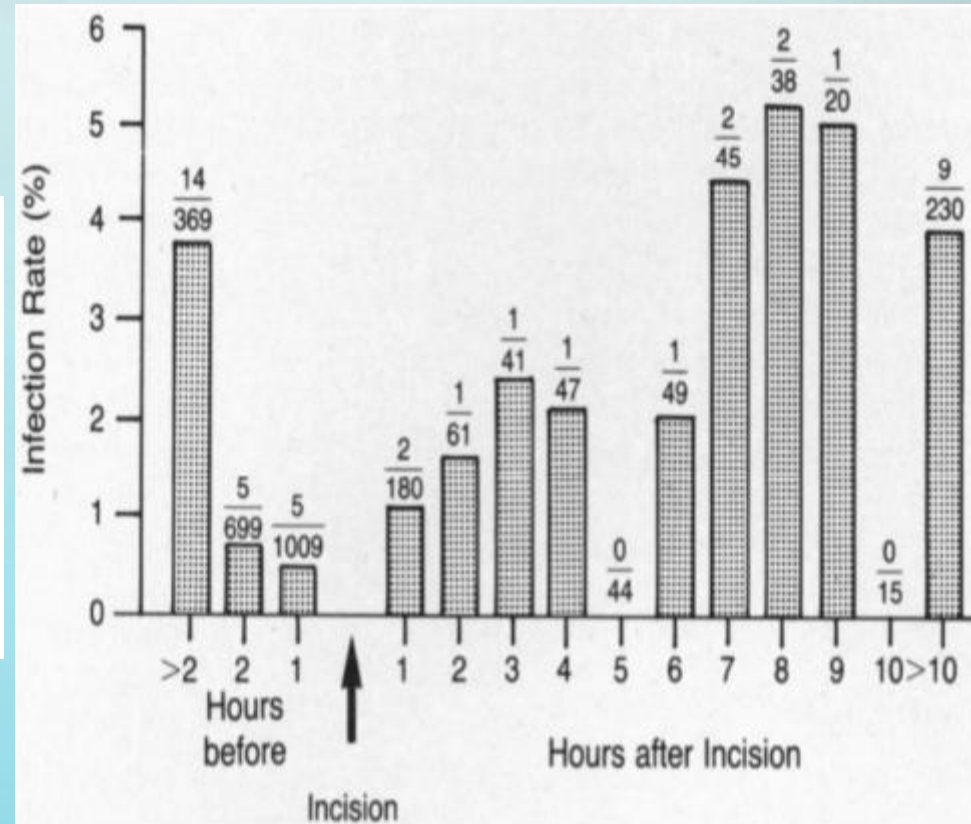
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- Baseline opioid requirement calculated by preceding 24h requirement per pt report
- Pain rated by a visual analog scale
- Post-op pain treated w/ PCA (morphine, fentanyl, hydromorphone) – transitioned to PO meds PRN POD #1 (after 24h)
- Results – total morphine consumption was significantly reduced in the treatment group at 24h, 48h and weeks post-op. Pain intensity scores were also significantly reduced in the PACU and 6 weeks post-op. No difference in side effects.
  - 24% less intra-op opiate use
  - 37% less morphine during 48h post-op
  - 26% reduction in pain intensity in the PACU
  - 71% reduction in opiate consumption at 6 week f/u
  - 52% reduction in 48h consumption in patients w/ baseline morphine equivalents >0.5 mg/h IV
- Strengths
  - Power of 0.9 to detect a 40% reduction in analgesic requirements was met with 102 patients (96 required)
  - Standard protocol for administration of intra-op drugs
  - All participants blinded
- Limitations
  - Standard protocol for which drugs were given during surgery – “all additional adjuncts administered were tracked” – deviations from the protocol never discussed

# Classen et al. The timing of prophylactic administration of antibiotics and the risk of surgical wound infection. (1992)

**Table 1. Temporal Relation between the Administration of Prophylactic Antibiotics and Rates of Surgical-Wound Infection.**

TIME OF ADMINISTRATION*	NO. OF PATIENTS	NO. (%) OF INFECTIONS	RELATIVE RISK (95% CI)	ODDS RATIO† (95% CI)
Early	369	14 (3.8)‡	6.7 (2.9–14.7)	4.3§ (1.8–10.4)
Preoperative	1708	10 (0.59)	1.0	
Perioperative	282	4 (1.4)¶	2.4 (0.9–7.9)	2.1   (0.6–7.4)
Postoperative	488	16 (3.3)‡	5.8‡ (2.6–12.3)	5.8** (2.4–13.8)
All	2847	44 (1.5)	—	—



**Figure 1. Rates of Surgical-Wound Infection Corresponding to the Temporal Relation between Antibiotic Administration and the Start of Surgery.**



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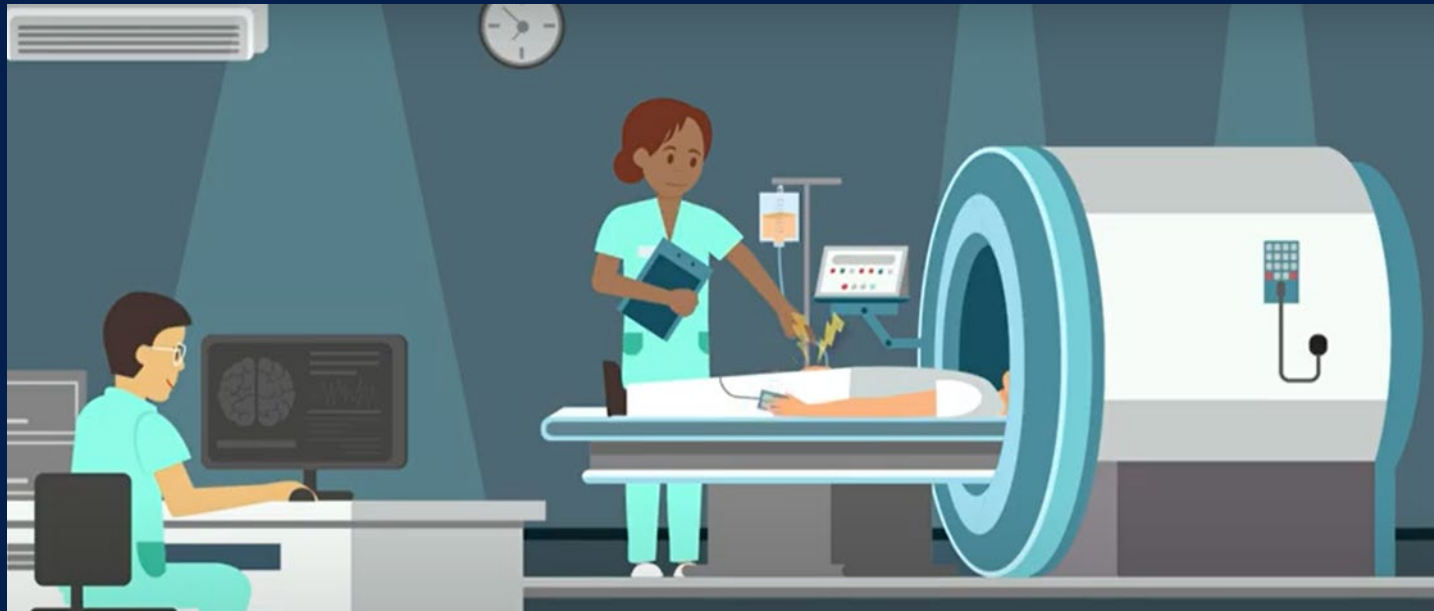
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# Anesthesia and cognition: Neural correlates of pain, consciousness, and memory modulation



**Keith Vogt, MD, PhD**  
Assistant Professor  
University of Pittsburgh

- Department of Anesthesiology & Perioperative Medicine
- Department of Bioengineering
- Center for the Neural Basis of Cognition



# Anesthetic modulation of memory, pain, and fear centers in the human brain

MAA11  
2022  
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Keith Vogt, MD, PhD  
Assistant Professor  
University of Pittsburgh

- Department of Anesthesiology & Perioperative Medicine
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Topic 1

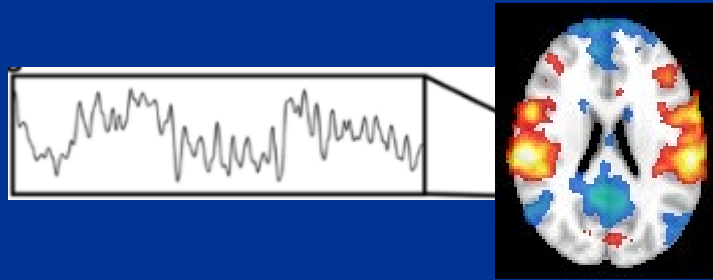
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Topic 2

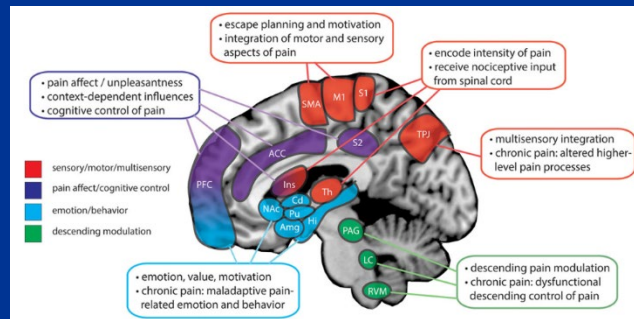
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Topic 3

Topic 3

# This talk focuses on how anesthetics affect cognition, particularly the interaction between pain and memory.



EEG & fMRI techniques



Human  
Cognitive  
Function



- Pain perception
- Consciousness
- Memory



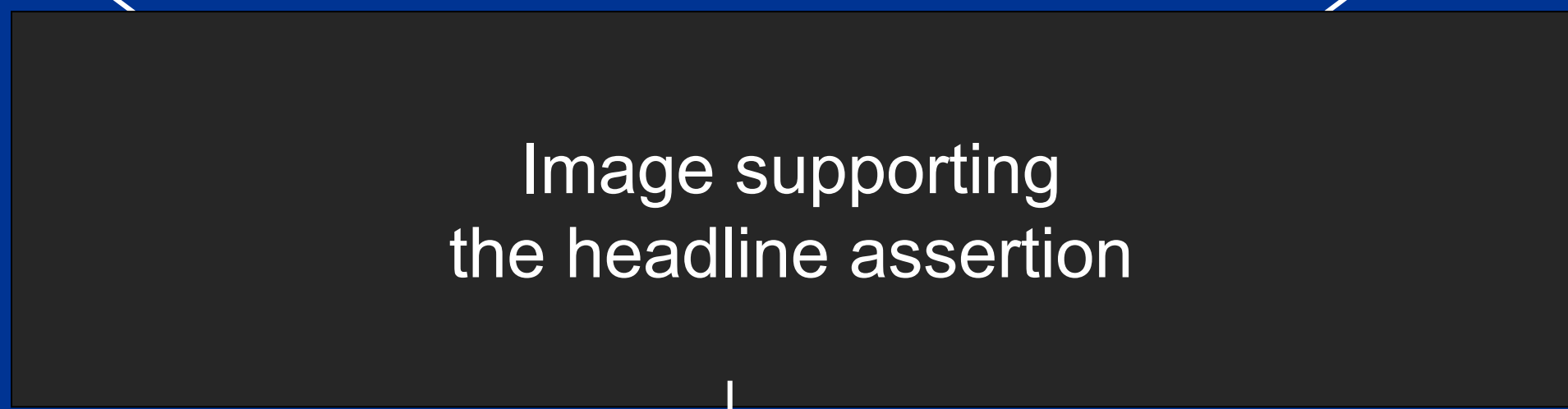
My current work on pain, memory, & anesthesia



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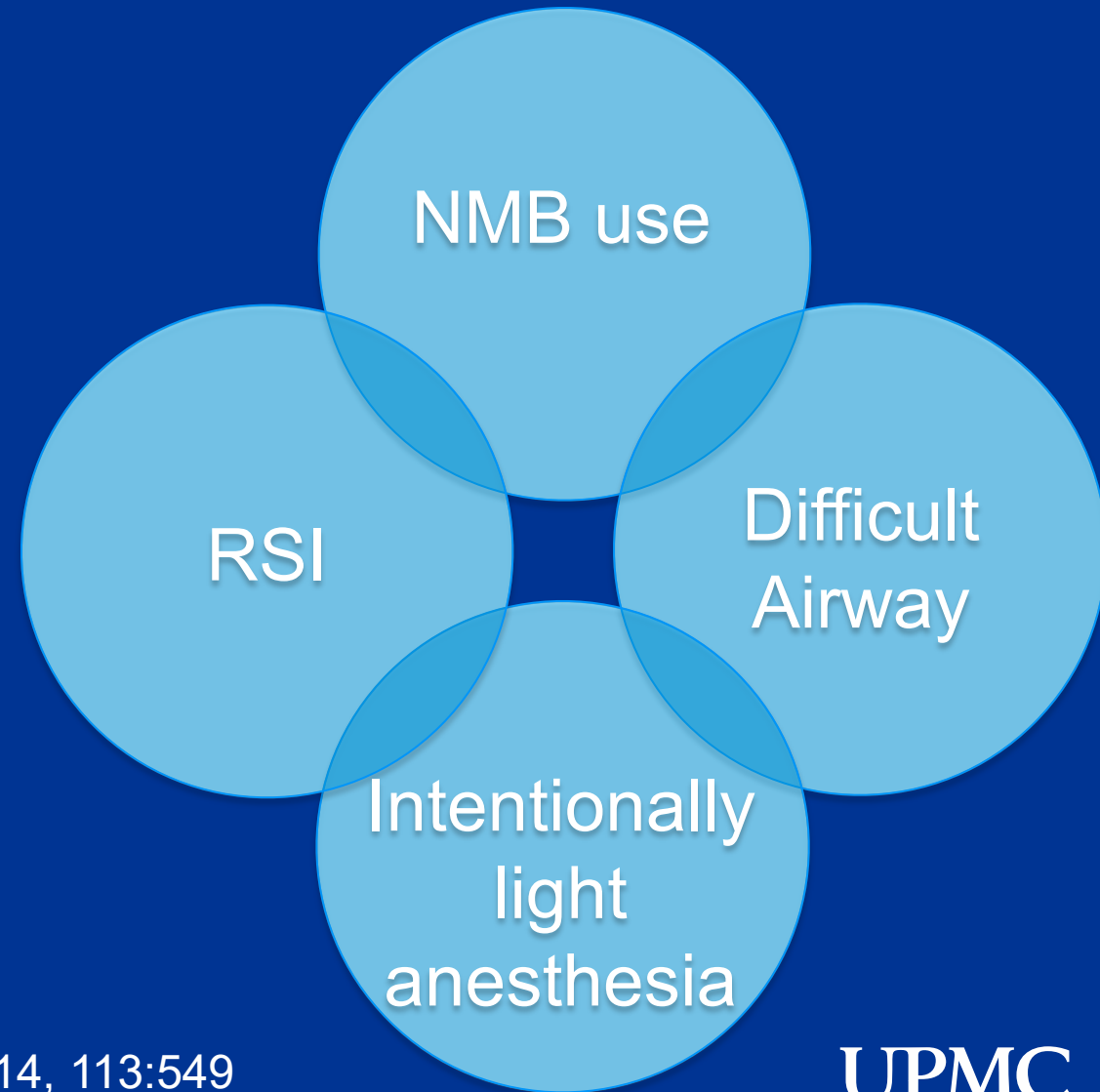
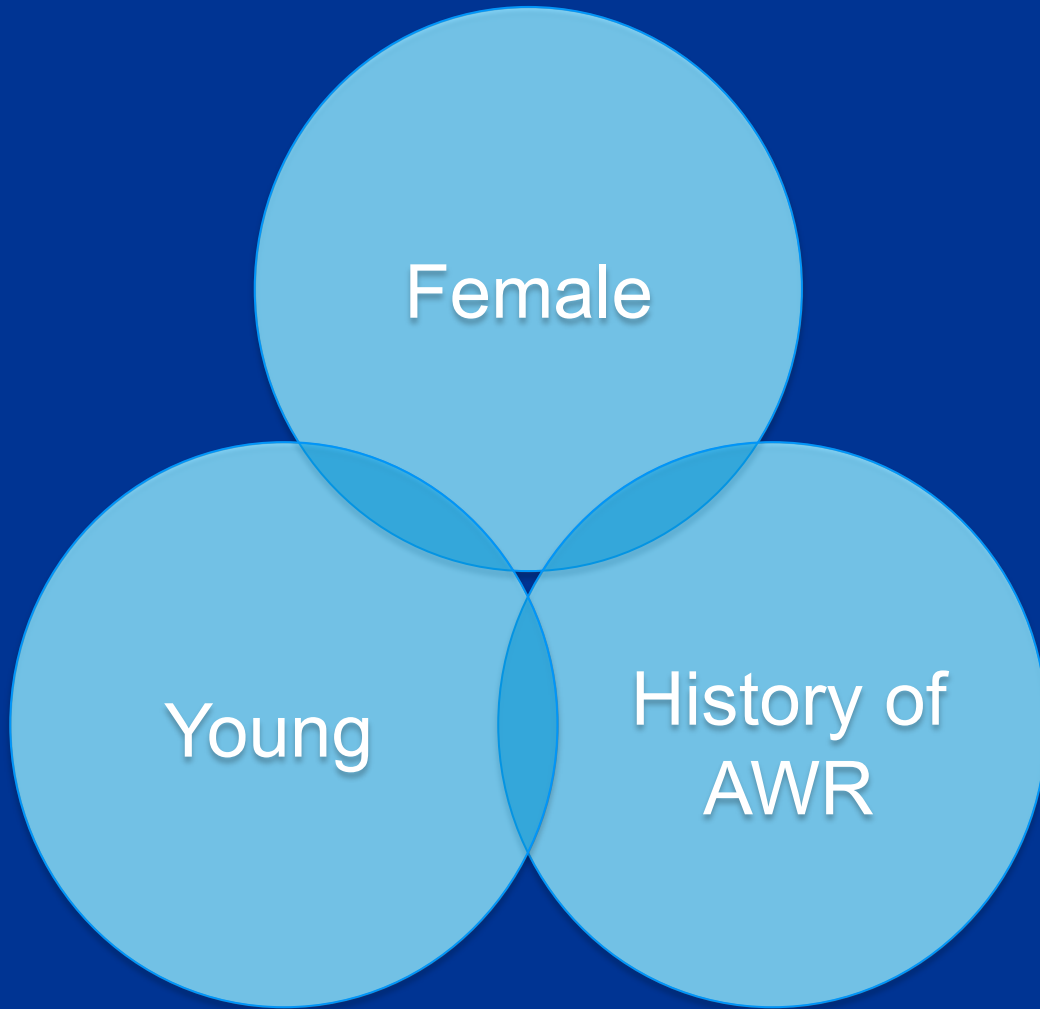
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Call-out, if necessary: keep to one or two lines



Call-out, if necessary: keep to one or two lines

# “Classic” anesthetic awareness risk factors are non-modifiable.



# Stroke and delirium have significant clinical impact.



## Stroke

- Incidence: 2-3%
- Mortality: 8x

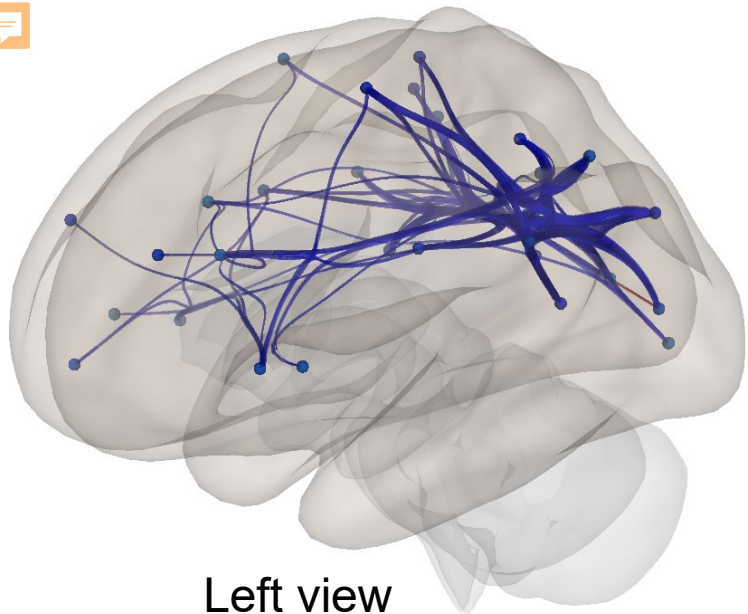


## Delirium

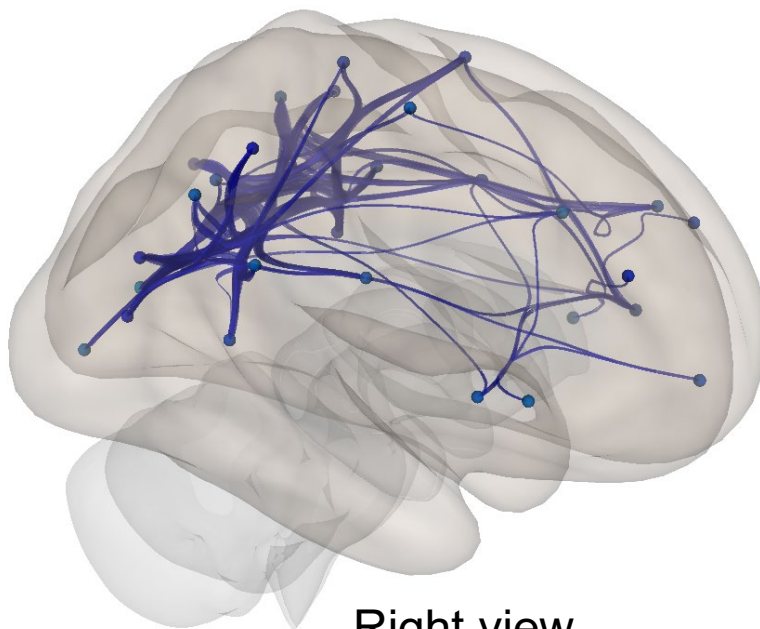
- Incidence: 20-50%
- ↑ Mortality
- ↑ Length of stay



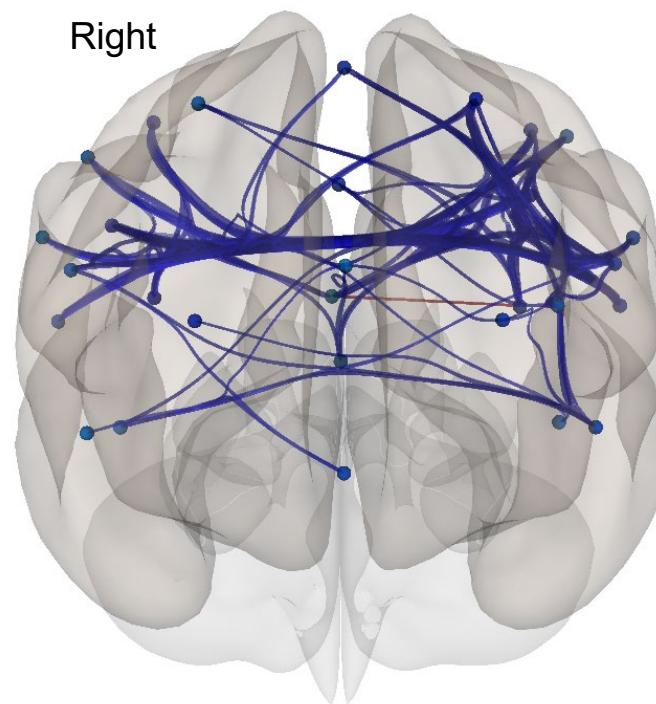
Under midazolam, the pattern of network-network connectivity change was **bilateral**, with **posterior predominance**.



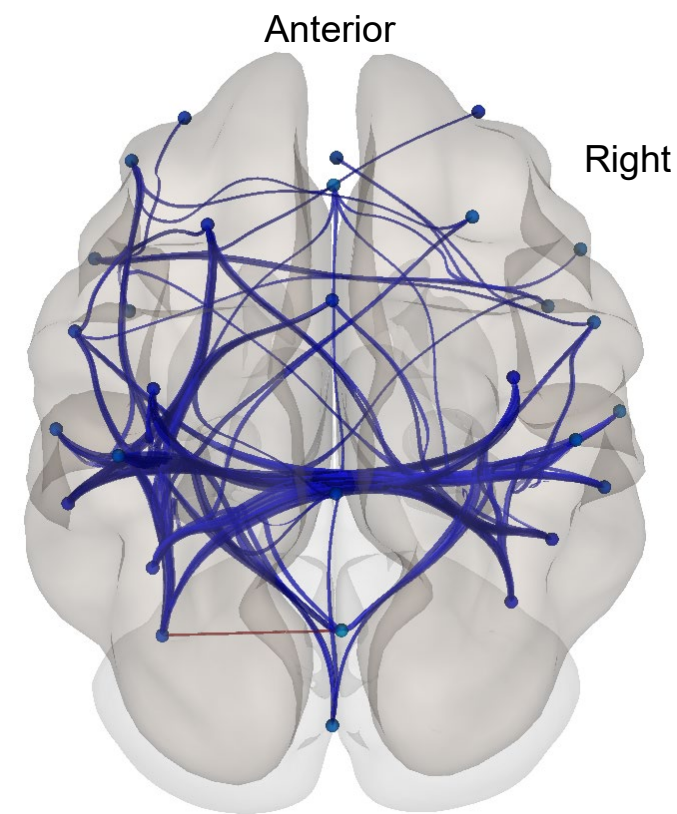
Left view



Right view



Anterior (coronal) view



Superior (axial) view

# Activation was broadly reduced under both drugs.

## Systems/Areas:

Memory

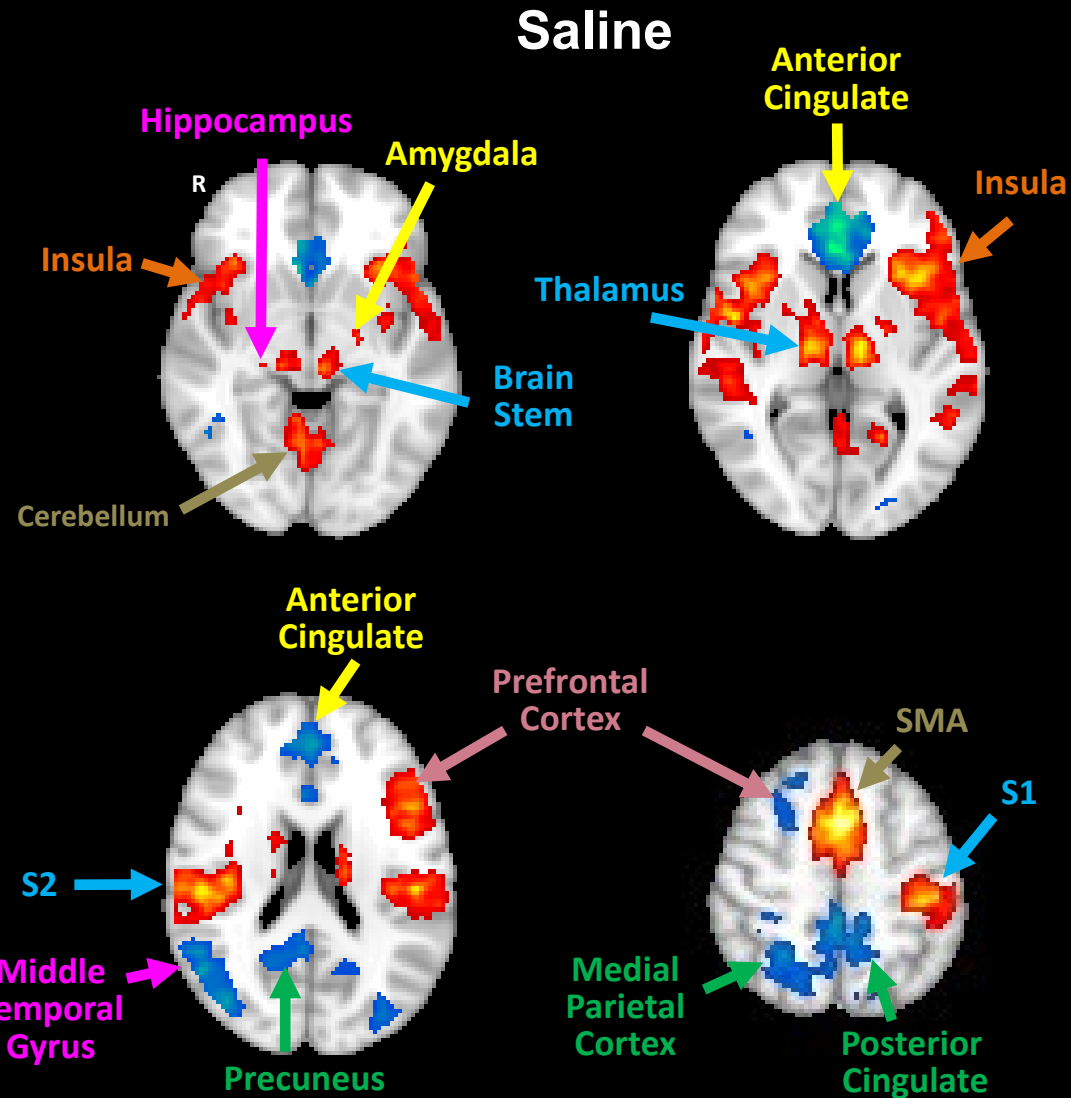
Fear learning

Pain processing

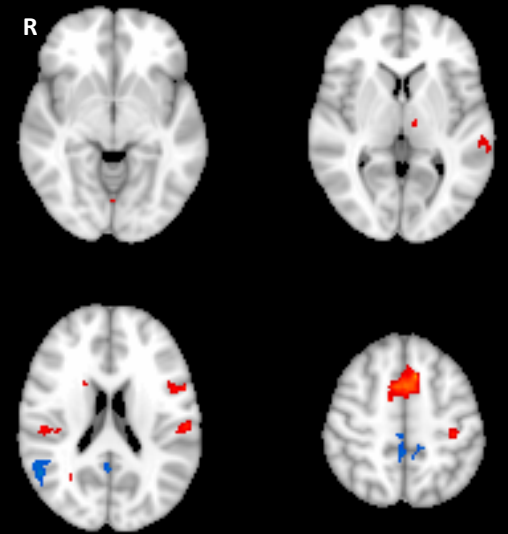
Somatosensory processing

Prefrontal cortex

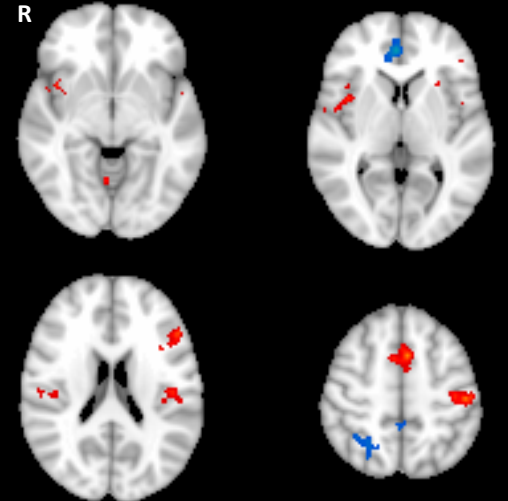
Default mode Network



## Ketamine

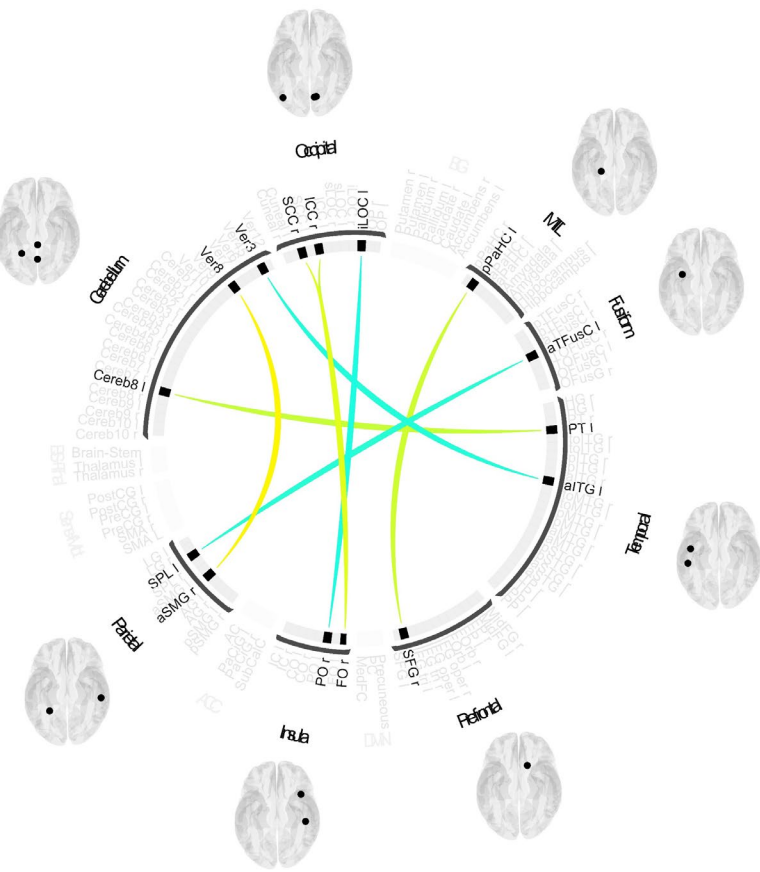


## Midazolam

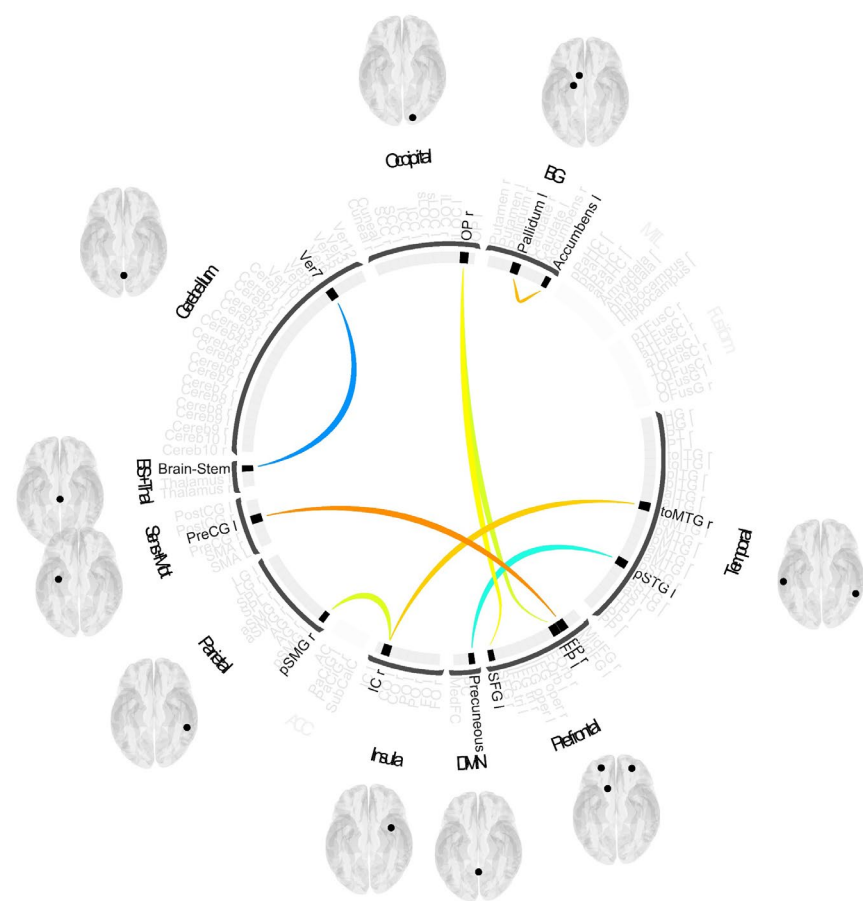




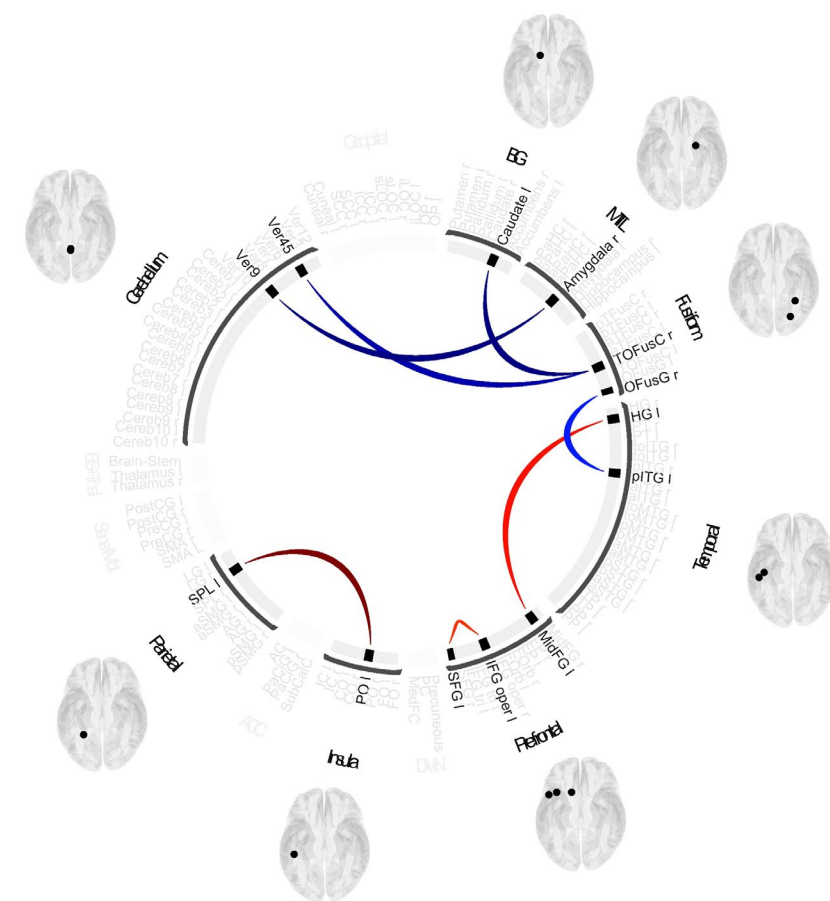
# Preliminary patterns of connectivity change differ between drugs.



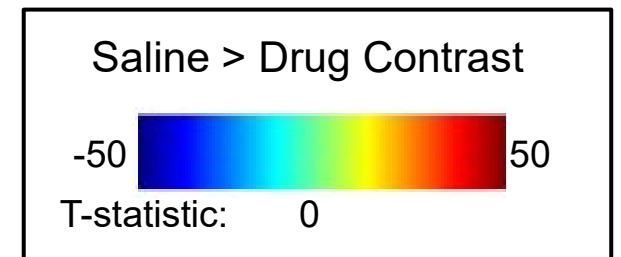
Saline (n=18) vs. Propofol (n=8)



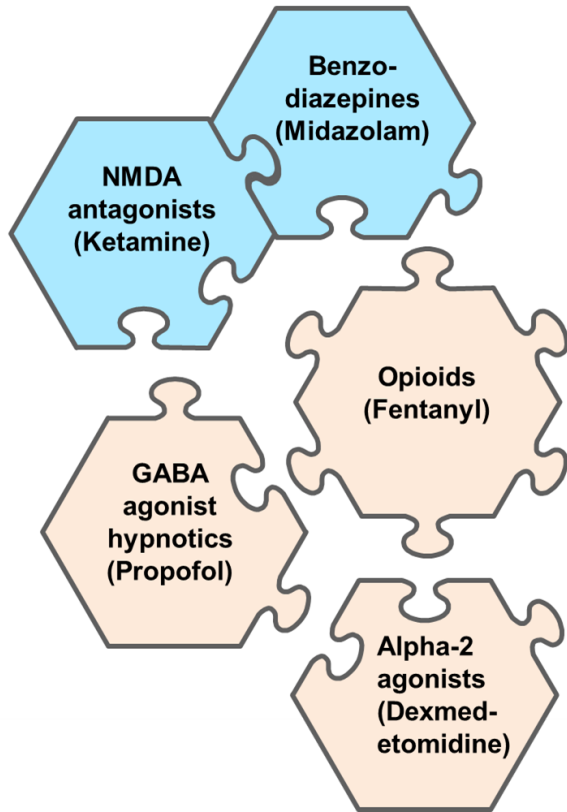
Saline (n=18) vs.  
Dexmedetomidine (n=6)



Saline (n=18) vs. Fentanyl (n=4)



# My current work builds on the FAER-funded study.



Healthy  
volunteer  
subjects

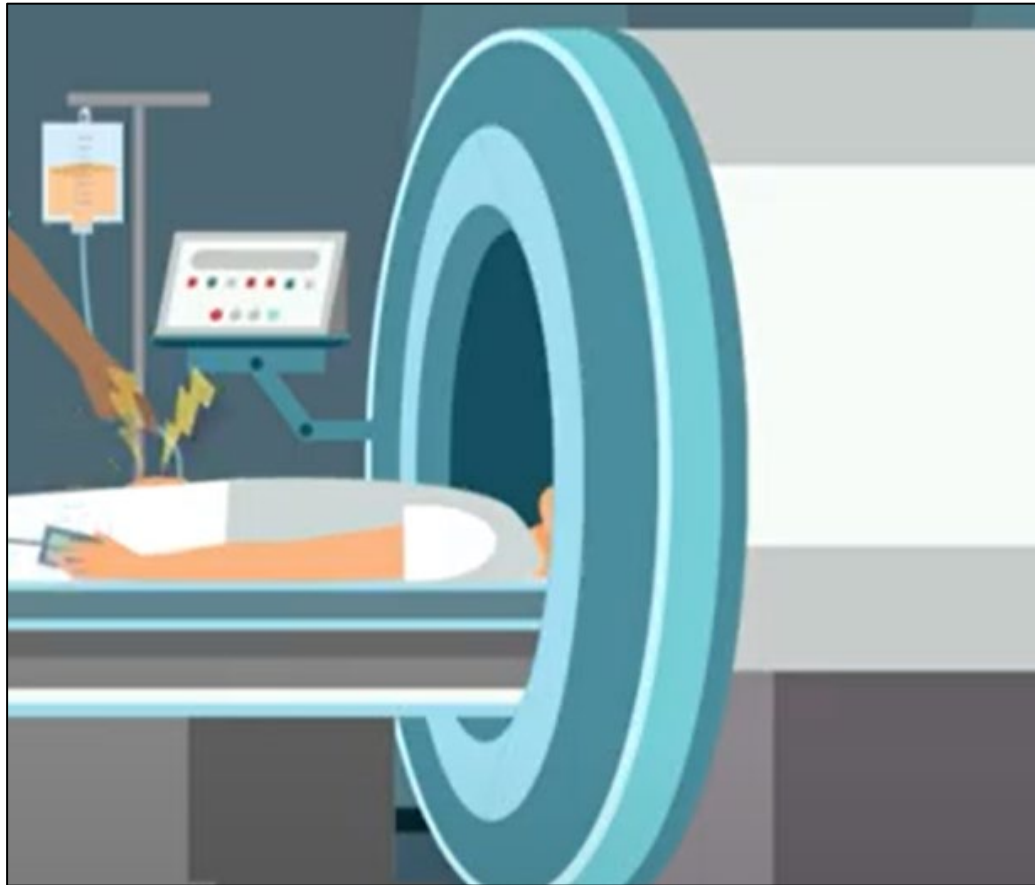


**Propofol** \_\_\_\_\_ mg/ml  
Date \_\_\_\_\_ Time \_\_\_\_\_ Int. \_\_\_\_\_

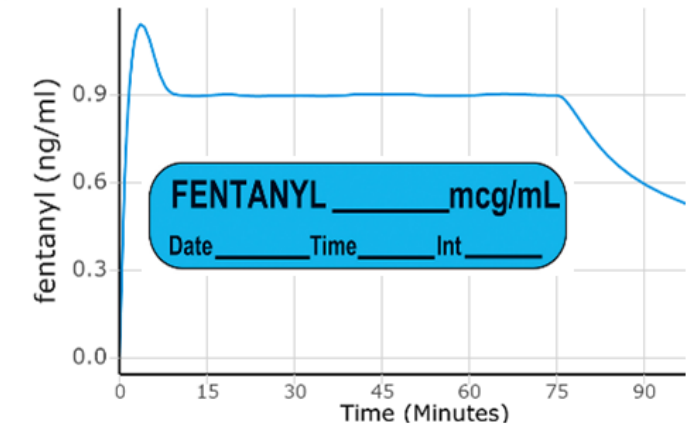
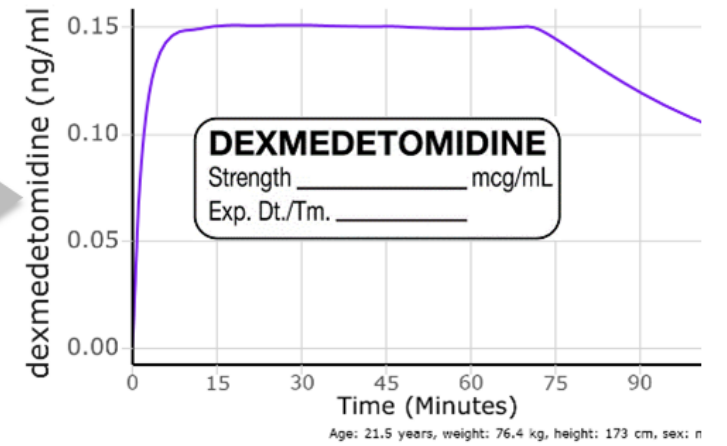
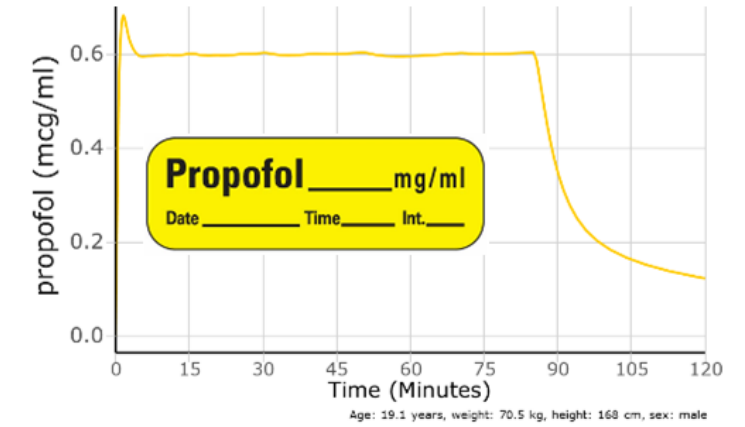
**DEXMEDETOMIDINE**  
Strength \_\_\_\_\_ mcg/mL  
Exp. Dt./Tm. \_\_\_\_\_

**FENTANYL** \_\_\_\_\_ mcg/mL  
Date \_\_\_\_\_ Time \_\_\_\_\_ Int. \_\_\_\_\_

# My current work builds on the FA



Healthy  
volunteer  
subjects



Additional slide graphic resources:

- <https://diagrammer.duarte.com/>
- <https://thenounproject.com/>

# Questions?