September 2, 2019

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BRIEF BIOGRAPHY

I study the physiology and treatment of uterine pain conditions. Dysmenorrhea, period pain, is the leading cause of school/work absence and foremost risk factor for chronic visceral pain in reproductive age women. Our NIH (*3 separate grants*) and institutionally funded laboratory has developed new animal models, investigated novel diagnostic methods, and conducted treatment studies. *Seven* of our eleven recent manuscripts on dysmenorrhea or related gynecological pain issues are published in the American Journal of Obstetrics & Gynecology, the most cited journal in gynecology. My goal is to systematically define the pathophysiology of dysmenorrhea and develop new treatments, while simultaneously training a cadre of future investigators to revolutionize the study of visceral pain. **Our research is essential because there are few other laboratories dedicated to eradicating dysmenorrhea, one of the most frequent causes of suffering and gender disparity worldwide.**

ACADEMIC AFFILIATIONS

2004-2009	Postdoctoral Scholar, Department of Neurobiology, Pharmacology and Physiology, University of Chicago
2009-2010	Research Associate (Assistant Professor), Department of Neurobiology, University of Chicago
2011-2019	Assistant Professor (part-time), Department of Obstetrics and Gynecology, University of Chicago
2019-	Research Associate Professor, Department of Obstetrics and Gynecology, University of Chicago

PROFESSIONAL AFFILIATIONS

2010-	Research Scientist, Co-founder of GyRL, Department of Obstetrics and Gynecology, NorthShore University HealthSystem

ACADEMIC TRAINING

1994-1998	B.S., Computer Science, University of Wisconsin-Madison
1998-2004	Ph.D., Neuroscience, The University of Pennsylvania

LICENSURE AND CERTIFICATIONS

2010-	CITI Certification in IRB compliance for Clinical Research, Good Clinical Practice & IACUC leadership
2012-	Federal and Illinois DEA licensure for research class drugs

SCHOLARSHIP

Peer-reviewed scientific publications in the primary literature, exclusive of abstracts (note trainees listed in italics):

1. Lytton WW, **Hellman KM**, Sutula TP. Computer models of hippocampal circuit changes of the kindling model of epilepsy. (1998) Artificial Intelligence in Medicine. 13(1-2):81-97. http://dx.doi.org/10.1016/S0933-3657(98)00005-0

2. Graves LA, **Hellman KM,** Veasey S, Blendy JA, Pack AI, Abel T. Genetic Evidence for a Role of CREB in Sustained Cortical Arousal. (2003) Journal of Neurophysiology 90(2):1152-9. http://jn.physiology.org/cgi/content/full/90/2/1152

3. Ouyang M, **Hellman KM**, Abel T, Thomas SA. Adrenergic Signaling Plays a Critical Role in the Maintenance of Waking and in the Regulation of REM Sleep. (2004) Journal of Neurophysiology. 92(4):2071-82 http://jn.physiology.org/cgi/content/full/92/4/2071

4. Keeley MB, Wood MA, Isiegas C, Stein J, **Hellman KM**, Hannenhalli S, Abel T. Differential Transcriptional Response to Non-Associative and Associative Components of Classical Fear Conditioning in the Amygdala and Hippocampus. (2006) Learning and Memory 13(2):135-42. http://learnmem.cshlp.org/content/13/2/135.long

5. Brink TS, **Hellman KM**, Lambert AM, Mason P. Raphe magnus neurons help protect reactions to visceral pain from interruption by cutaneous pain. (2006) Journal of Neurophysiology 96(6):3423-32. http://jn.physiology.org/cgi/content/full/96/6/3423

6. **Hellman KM**, Abel T. Fear Conditioning Increases NREM sleep. (2007) Behavioral Neuroscience 121(2):310-323. http://psycnet.apa.org/journals/bne/121/2/310.pdf

7. **Hellman KM**, Brink TS, Mason P. Activity of murine raphe magnus cells predicts tachypnea and on-going nociceptive responsiveness. (2007) Journal of Neurophysiology 98(6):3121-33. http://jn.physiology.org/cgi/content/full/98/6/3121

8. **Hellman KM**, Mendelson SJ, Mendez-Duarte MA, Russell JL, Mason P. Opioid microinjection into raphe magnus modulates cardiorespiratory function in mice and rats. (2009) American Journal of Physiology 297(5): R1400-8 http://ajpregu.physiology.org/cgi/reprint/00140.2009v1.pdf

9. **Hellman KM**, Hernandez P, Young A, Park A, Abel T. Genetic Evidence that Protein Kinase A Regulates Thalamocortical Oscillations during NREM Sleep. (2010) Sleep 33(1):19-28. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2802244/

10. Tu FF, **Hellman KM**, Backonja M. Gynecological Management of Neuropathic Pain. (2011) American Journal of Obstetrics & Gynecology 205(5):435-43. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3205239/

11**. Hellman KM**, Mason P. Opioids disrupt pro-nociceptive modulation mediated by raphe magnus. (2012) Journal of Neuroscience 40:13668-78. http://www.jneurosci.org/content/32/40/13668.long

12. Tu FF, Epstein AE, Pozolo KE, Sexton DL, Melnyk AI, **Hellman KM**. A Non-Invasive Bladder Sensory Test Supports a Role for Dysmenorrhea Increasing Bladder Noxious Mechanosensitivity. (2013) Clinical Journal of Pain 29(10):883-90. http://dx.doi.org/10.1097/AJP.0b013e31827a71a3

13. *Westling AM*, Tu F, Griffith JW, **Hellman KM**. The association of dysmenorrhea with noncyclic pelvic pain accounting for psychological factors. (2013) American Journal of Obstetrics & Gynecology 209(5): 422.e1-422.e10 http://dx.doi.org/10.1016/j.ajog.2013.08.020

14. **Hellman KM**, *Patanwala IY, Pozolo KE*, Tu FF. Multimodal nociceptive mechanisms underlying chronic pelvic pain. (2015) American Journal of Obstetrics & Gynecology 213(6):827.e1-9. http://dx.doi.org/10.1016/j.ajog.2015.08.038

15. Tu FF, *Kane J*, **Hellman KM**. Non-invasive experimental bladder pain assessment in painful bladder syndrome. (2016) British Journal of Obstetrics & Gynecology 124(2):283-291. http://dx.doi.org/10.1111/1471-0528.14433

16. **Hellman KM**, *Yu PY, Oladosu, FA Segel C, Han A*, Prasad PV, Jilling T, Tu FF. The Effects of Platelet-Activating Factor on Uterine Contractility, Perfusion, Hypoxia, and Pain in Mice. (2017) Reproductive Sciences 25(3):384-394 http://doi.org/10.1177/1933719117715122

17. Oladosu FA, Tu FF, **Hellman KM**. Nonsteroidal antiinflammatory drug resistance in dysmenorrhea: epidemiology, causes, and treatment. (2017) American Journal of Obstetrics & Gynecology 218(4):390-400 http://doi.org/10.1016/j.ajog.2017.08.108

18. **Hellman KM**, *Kuhn CS*, Tu FF, *Dillane KE, Shlobin NA*, Senapati S, *Zhou X*, Li W, Prasad PV. CINE MRI During Spontaneous Cramps in Women with Menstrual Pain. (2018) American Journal of Obstetrics & Gynecology. 218(5):506.e1-506.e8 http://doi.org/10.1016/j.ajog.2018.01.035

19. *Zuckerman RM*, Silton RL, Tu FF, Eng JS, **Hellman KM**. Somatic Symptoms in Women with Dysmenorrhea and Noncyclic Pelvic Pain. Archives of Women's Mental Health. (2018). . http://doi.org/10.1007/s00737-018-0823-4

20. **Hellman KM***, Datta A*, Steiner ND, *Kane J*, Garrison EF, Clauw DJ, Tu FF. Identification of experimental bladder sensitivity among dysmenorrhea sufferers. (2018) American Journal of Obstetrics & Gynecology. 219(1):84.e1-84.e8. http://doi.org/10.1016/j.ajog.2018.04.030

21. *Oladosu* FA, Tu FF, *Farhan S*, Garrison EF, Steiner ND, Roth GE, **Hellman KM.** Abdominal skeletal muscle activity precedes spontaneous menstrual cramping pain in primary dysmenorrhea (2018) American Journal of Obstetrics & Gynecology. 219(1):91.e1-91.e7. http://doi.org/10.1016/j.ajog.2018.04.050

22. *Oladosu FA*, **Hellman KM**, Ham PJ, *Kochlefl L, Datta A*, Garrison EF, Steiner ND, Roth GE, Tu FF. Persistent autonomic dysfunction and bladder sensitivity in primary dysmenorrhea (2019) Scientific Reports 18;9(1):2194. https://doi.org/10.1038/s41598-019-38545-3

23. *Oladosu FA*, Tu FF, Garfield LB, Garrison EF, Steiner ND, Roth GE, **Hellman KM.** Low serum oxytocin concentrations are associated with painful menstruation. (2019) Reproductive Sciences. *in press*

Letter, commentaries and editorials

Mason P, **Hellman KM** review of Changes in expression of NMDA-NR1 receptor subunits in the rostral ventromedial medulla modulate pain behaviors. Faculty of 1000: http://f1000.com/prime/6657956

Mason P, **Hellman KM** review of Acetate causes alcohol hangover headache in rats. Faculty of 1000: http://f1000.com/prime/8249956

Mason P, **Hellman KM** review of Unmasking the tonic-aversive state in neuropathic pain. Faculty of 1000: http://f1000.com/prime/1168048

Hellman KM, Summary of relevant findings at SFN 2016. Pelvic Pain Special Interest Group Newsletter (January 2016)

Hellman KM, Tu FF, Reply to Ruan et al. Multimodal nociceptive mechanisms underlying chronic pelvic pain. American Journal of Obstetrics & Gynecology, Volume 215, Issue 1, 132 – 133. http://dx.doi.org/10.1016/j.ajog.2016.02.051

Books:

As a reviewer of scientific content:
Mason P. Medical Neurobiology. (2011) 665 pp. Oxford University Press

Book chapters:

Hellman KM, Abel T. (2003) Chapter 15: Molecular Mechanisms of Memory Consolidation. Sleep and Brain Plasticity. Editors: Maquet P, Smith C, and Stickgold R. Oxford University Press.

Posters with published abstracts

1. Hellman KM, Lytton WW, Kornguth SE, Sutula TP. Computer modeling of dentate gyrus used to devise physiological tests of connectivity. Society for Neuroscience, Washington DC November 1996.

2. Lytton WW, Hellman KM, Sutula TP. Computer Network model of mossy fiber sprouting in dentate gyrus. American Epilepsy Society December 1996.

3. Lytton WW, Hellman KM, Lynch MW, Sutula TP. Sparse inter-blade sprouting enhances sustained activity in computer model of kindled dentate gyrus slices. American Epilepsy Society December 1997.

4. Hellman KM, Finkel LH, Contreras D. Computer modeling of compartmental neurons used to estimate sodium channel density. Society for Neuroscience, Miami Florida, October 1999.

5. Hellman K, Graves L, Pack A, Abel T. Alterations in sleep after fear conditioning. APSS, Chicago, IL. July 2001.

6. Hellman KM, Ouyang M, Abel T, Thomas SA. Adrenergic Signaling Plays a Critical Role in the Maintenance of Waking and in the Regulation of REM Sleep. APSS, Chicago, IL. 2003.

7. Hellman, KM, Young A, Abel T, Genetic Evidence that Protein Kinase A Regulates Thalamocortical Oscillations during NREM sleep. APSS, Philadelphia, PA. 2004.

8. Hellman, KM, Abel T, Fear Conditioning Increases NREM sleep and Delta Oscillations. APSS, Philadelphia, PA. 2004.

9. Hellman KM, Brink TS, Mason, P. The response to cutaneous, not visceral stimulation predicts the effects of opioids on raphe magnus neurons. Society for Neuroscience, Washington DC, November 2005.

10. Hellman KM, Mendelson SJ, Mason P. Nonserotonergic neurons within the raphe magnus regulate respiratory rate and contribute to opioidergic respiratory depression. Society for Neuroscience, San Diego, November 2007.

11. Ohlson E, Mendez-Duartes MA, Mendelson SJ, Hellman KM, Mason P. Naloxone methiodide pre-treatment attenuates respiratory depression consequent to systemic morphine. Society for Neuroscience, Washington DC, November 2008.

12. Hellman KM, Mendelson SJ, Mendez-Duartes MA, Russel J, Ohlson E, Mason P. Opioid signaling within raphe magnus elicits respiratory depression in mice but not rats. Society for Neuroscience, Washington DC, November 2008.

13. Hellman KM, Mason P. Anti-lock analgesia: A pulsatile model for descending opioid modulation suggested by recordings of medullary neurons in unanesthetized mice. Society for Neuroscience, Chicago, November 2009.

14. Teo S, Khosla N, Hellman KM, Mason P. A potential role for nociceptive-modulatory neurons in the raphe magnus in intradermal serotonin-induced hyperalgesia Society for Neuroscience, San Diego, November 2010.

15. Hellman KM, Tu FF A new mouse model supports a role for TRPV1 in uterine nociception. Society for Neuroscience, Washington DC, November 2011.

16. Hellman, KM, Carrow, J., Sandwick, V., Yu, P., Edelmuth, A., Segel, S., Tu, F. Deciphering the role of uterine contractility and blood perfusion in uterine pain. International Pelvic PainSociety Annual Fall Meeting, Las Vegas, October Nevada 2011.

17. Yu P, Jilling T, Segel C, Tu FF, Hellman KM. Deciphering the roles of inflammation, neural activity, blood perfusion and uterine contractility in uterine pain. Society for Gynecological Investigation, San Diego, March 2012.

18. Westling, A. Tu FF, Griffith J, Hellman KM. Severity of dysmenorrhea is correlated with overall elevated pain report. Society for Gynecological Investigation, San Diego, March 2012.

19. Yu P, Segel S, Jilling T, Tu FF, Hellman KM. Deciphering the physiological explanation for uterine pain. World Congress on Pain, Milan. August 2012.

20. Hellman KM, Tu FF, Epstein AE, Sexton DL, Melnyk AI. A novel non-invasive bladder sensory test supports a role for dysmenorrhea increasing bladder nociception. World Congress on Pain, Milan. August 2012.

21. Tu FF, Hellman KM, Yu PY, Pozolo. Reduced pain thresholds among women with chronic pelvic pain and dysmenorrhea. World Congress on Pain, Milan. August 2012.

22. Hellman KM, Yu P, Segel C, Tu FF. Channelrhodopsin stimulation demonstrates a role for brainstem modulation in uterine nociceptive physiology. Society for Neuroscience, New Orleans. October 2012.

23. Hellman KM, Tu FF, Epstein AE, Sexton DL, Melnyk AI. A novel non-invasive bladder sensory test supports a role for dysmenorrhea increasing bladder nociception. International Pelvic Pain Society, Chicago. October 2012.

24. Tu FF, Hellman KM, Yu PY, Pozolo. Reduced pain thresholds among women with chronic pelvic pain and dysmenorrhea. International Pelvic Pain Society, Chicago. October 2012.

25. Westling, A. Tu FF, Griffith J, Hellman KM. Severity of dysmenorrhea is correlated with overall elevated pain report. International Pelvic Pain Society, Chicago. October 2012.

26. Hellman KM, Senapati S, Tu FF. Optical diagnostics of pain targets during laparoscopic surgery. AAGL, Las Vegas. November, 2012.

27. Hellman KM, Tu FF. Electrosonographic Diagnostics for Pelvic Pain. Translational Research to Inform Modern Medicine Symposium, Chicago. September, 2012.

28. Senapati S, Tu FF, Hellman KM. Anxiety, Sleep, Pain Sensitivity and the Response to Laparoscopic Management of Pelvic Pain. AAGL. Washington DC, November 2013.

29. Tu FF, Hellman KM, Myosonographic Diagnostics for Pelvic Pain. The 60th annual meeting for the Society for Gynecological Investigation. Orlando, FL. March 2013.

30. Tu FF, Pozolo K, Resnick J, Borushko E. Hellman KM. Comparative Study of Clinical vs. Quantitative Measures of Pelvic Sensitivity. Washington DC, November 2013.

31. Tu FF, Hellman KM. The Role of Visceral Motor Reflexes in Menstrual Pain. Society for Neuroscience, November 2013.

32. Hellman KM, Tu FF Behavioral and physiological characterization of the molecules involved in menstrual pain. Society for Neuroscience, November 2014.

33. Tu F, Hellman KM, Kane J, Resnick J, Pozolo K, Borushko, E A novel visceral sensitivity task evaluates bladder hyperalgesia independent of psychological factors. International Association for the Study of Pain 15th World Congress on Pain, Buenos Aires, Argentina, August 2014.

34. Zuckerman R, Kane J, Silton RL, Hellman KM, Tu FF, Somatic complaint in dysmenorrhea and other visceral pains, Society for Neuroscience, October 2015.

35. Dillane K, Harte SE, Polnazsek K, Tu FF, Silton RL, Hellman KM, Neural correlates of sensory amplification in dysmenorrhea and other visceral pain conditions, Society for Neuroscience, October 2015.

36. Polnazsek K. Dillane K, , Tu FF, Hellman KM, Silton RL, The effects of depression, dysmenorrhea, and sensory amplification on resting state brain activity, Society for Neuroscience, October 2015.

37. Rosenbaum, J, Kuhn, C, Tu, FF, Hellman, KM. Ultrasonographic investigation of the mechanisms involved in menstrual cramps. Abstract published in Journal of Minimally Invasive

Gynecology Nov-Dec;22(6S):S16. American Association of Gynecologic Laparoscopists 45th Global Congress of Minimally Invasive Gynecology, Los Vegas 2015.

38. Kuhn, C, Senapati, SS, Tu, FF, Hellman, KM. The relationship between fMRI events resembling sustained uterine contractions and spontaneous menstrual cramping report. International Pelvic Pain Society, Chicago, IL, October 2016.

39. Senapati, SS, Tu, FF, Kuhn, C, Hellman, KM. Functional phenotyping of menstrual pain. American Association of Gynecologic Laparoscopists 45th Global Congress of Minimally Invasive Gynecology, Orlando, FL 2016.

40. Zuckerman, R, Hellman, KM, Silton, RL, Tu, FF. The distinct roles of somatization in menstrual and non-menstrual pelvic pain. International Pelvic Pain Society, Chicago, IL. 2016.

41. Polnaszek, K.L., Silton, R.L., Dillane, K., Harte, S., Tu, F., & Hellman, K. (2016). Neural Correlates Of Sensory Amplification In Women With Dysmenorrhea. Society for Affective Science, Chicago, IL March 2016.

42. Hellman KM, Silton RL, Dillane K, Polnaszek K, Harte S, Tu, FF. Cortical mechanisms of sensory amplification in visceral pain conditions. IASP September 29th, 2016. Yokohama, Japan.

43. Hellman, K, Gebhart, G, Garrison, E, Steiner, N, Kane, J, Tu, F. Development of a paradigm to prevent bladder pain. 3rd World Congress on Abdominal and Pelvic Pain Annual Meeting, Washington, D.C. 2017.

44. Laus, K, Gebhart, G, Garrison, E, Steiner, N, Tu, F, Hellman, K. Noninvasive objective measurement of uterine perfusion/ oxygenation and the effects of naproxen. 3rd World Congress on Abdominal and Pelvic Pain Annual Meeting, Washington, D.C. 2017.

45. Oladosu, F, Gebhart, G, Garrison, E, Steiner, N, Tu, F, Hellman, K. Menstrual pain unresponsive to naproxen is related to low naproxen serum levels. 3rd World Congress on Abdominal and Pelvic Pain Annual Meeting, Washington, D.C. 2017.

46. Domokos F, Polnaszek KL, Kahrilas IJ, Bryant FB, Tu FF, Hellman. KM, Silton RL. Savoring past and present positive events boosts positive affect for individuals with pain symptoms, Midwestern Psychological Association, Chicago, IL April 2017.

47. Cockrum, RH, Tu, FF, Roth, GE, Garrison, EF, Oladosu, FA, Hellman, KM. (2018) Development of a method to characterize vascular contributions to cramping pain in dysmenorrhea. The Journal of Minimally Invasive Gynecology Nov-Dec 25(7):S200. AAGL.

48. Hellman, KM, Laus, K, Oladosu, F, Garrison, E. (2018) Noninvasive objective MRI method to evaluate uterine hemodynamic function and the effects of Naproxen. Reproductive Sciences 25:118A-119A.

49. Hellman, KM, Tu, F, Garrison, E, Oladosu, F. (2018) Identification of a preclinical phenotype for the development of painful bladder syndrome in women with isolated dysmenorrhea. Reproductive Sciences 25:221A.

50. Oladosu, F, Garrison, E, Hellman, K. (2018) NSAID-resistant menstrual pain is due to low serum levels of NSAIDs. Reproductive Sciences 2018 25:145A.

51. Kuhn, C, Hellman, K, Tu, F. (2018) Cine MRI during spontaneous cramps in women with menstrual pain [7q]. American Obstetrics and Gynecologists 66th Annual Clinical and Scientific Meeting, Austin, TX.

52. Roth, G, Tu, F, Oladosu, F, Garrison, E, Steiner, N, Hellman, K. (2018) Multisensory hypersensitivity: A possible risk factor in the transition from episodic to chronic pain among women with dysmenorrhea. International Association for the Study of Pain 17th World Congress on Pain, Boston, MA.

53. Oladosu, F, Tu, F, Garrison, E, Ham, P, Steiner, N, Roth, G, Hellman, K. (2018) The interplay between heart rate variability and conditional pain modulation in dysmenorrhea. International Association for the Study of Pain 17th World Congress on Pain, Boston, MA.

54. Oladosu, FA, Hellman, KM, Garrison, EF, Steiner, ND, Roth, GE, Tu, FF. (2018) The interplay between heart rate variability and conditioned pain modulation in dysmenorrhea. International Pelvic Pain Society Annual Meeting, Chicago, IL.

55. Oladosu, FA, Tu, FF, Garrison, EF, Steiner, ND, Roth, GE, Hellman,KM. (2018) Menstrual pain unresponsive to naproxen is due to low naproxen serum levels. University of Chicago Post-Doctoral Symposium. Chicago, IL.

56. Shlobin, A, Tu, FF, Oladosu, FA, Garrison, EF, Steiner, ND, Roth, GE, Hellman, KM. (2018) Mechanisms underlying the comorbidity of dysmenorrhea and IBS. International Pelvic Pain Society Annual Meeting, Chicago, IL

57. Hellman, K., F. Oladosu, and F. Tu. "(133) Preliminary Analysis of the Relationship between Refractory Menstrual Pain and Naproxen Metabolism." The Journal of Pain 20.4 (2019): S9-S10. American Academy of Pain Medicine

58. Roth, G.E., Hellman, K.M., Silton, R.L., & Tu, F.F. Dimensional analysis of psychological symptoms in multimodal experimental pain sensitivity in women with pelvic pain. (2019) Annual meeting of the Society for Research in Psychopathology, Buffalo, NY.

59. Hellman, K.M., Roth, G.E., Dillane, KD, Steiner, NS, Tu, FF. Women with heightened dysmenorrhea and silent bladder sensitivity exhibit broad abnormalities in pain experience and quantitative sensory testing. (2019) International Pelvic Pain Society. Toronto, Canada.

Other works that are publicly available:

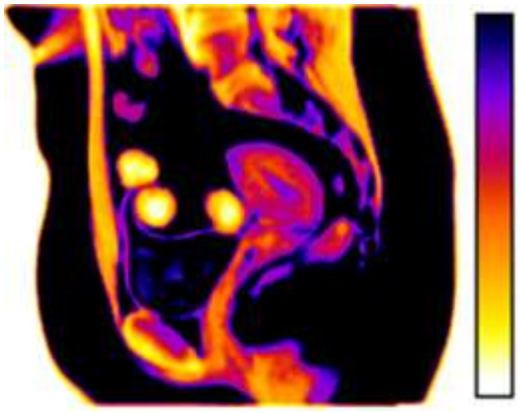
Interview on the Pelvic Messenger blogtalk RadioShow (2014): The Holy Grail of Prevention of Pelvic Pain. http://www.blogtalkradio.com/pelvicmessenger/2014/02/21/the-holy-grail-of-prevention-of-pelvic-pain

Video on the mechanisms of menstrual pain htttp://ow.ly/9Y3p30jR6Ab #PMDD #PeriodProblems #menstruation #obgyn #ACOG (more than 600 views)

2018 IASP Global Year for Excellence in Pain Education Webinar: Abdominal and Pelvic Pain: Scientific Progress Vis-à-vis Clinical Evaluation and Management http://www.facebook.com/IASP.pain/videos/1855277747844618/ (more than 200 live registrations and cumulatively 1200 views)

Cover Artwork:

May 2018 issue of American Journal of Obstetrics & Gynecology:



Single pseudocolor frame from a new method for studying causes of menstrual pain using cine MRI. The full sequence shows myometrial activity before the perception of a self-reported menstrual cramp indicative of a potential cause of dysmenorrhea. [Image enhanced in ImageJ for cover artwork]

Works in review, in preparation, etc. not yet publicly available

Hellman KM, Silton RL, Dillane KE, Polnazsek K, Harte SE, Tu FF. Cortical Mechanisms of sensory amplification in visceral pain sensitivity. [*under revision for Journal of Pain*]

Oladosu FA, Tu FF, Garrison EF, Steiner ND, **Hellman KM**, The relationship between refractory menstrual pain and serum naproxen concentration [*complete draft-performing an additional validation step prior to submission*]

Polnazsek MA, **Hellman KM**, Tu FF, Silton RL. The Association of Steady State Prefrontal Cortical Activity with Bladder Sensitivity in Dysmenorrhea [*in preparation*]

FUNDING

Past:

1. Epilepsy Foundation of America: Student Research Award. Title: Computational Model of Dentate Gyrus. 6/1/99-9/1/99 $5000.

2. NIH MH064329-02. Graduate Student National Research Service Award. Memory Consolidation and Sleep. 9/1/02- 8/31/03 $60,630.

3. NIH DA022429. PI: P. Mason. Role: Co-investigator. Opioid Analgesia in Awake Mice. $416,989.

4. American Academy of Sleep Medicine. Role: PI. “Neurophysiological Investigation of Pain Induced Arousal” 01/04/06 - 01/03/07. $60,000.

5. NorthShore Research Career Development Award. PI: KM Hellman. Modulation of Pain and Autonomic Function. 10/1/10-10/1/13. $225,000.

6. NIH HD081709. PI: KM Hellman. Neurophysiological Diagnostics for Menstrual Pain 8/01/2014-7/31/17. $414,996.

Current:

1. NIH HD09150102. PI: KM Hellman "Noninvasive imaging of uterine physiology to improve dysmenorrhea" 08/2/17-06/31/19 $429,000. (40% salary support)

2. NIH DK100368. PI: FF Tu. My role: Co-investigator. "Deciphering the hormonal and nociceptive mechanisms underlying bladder pain" 04/01/2014 – 03/31/2019 $2,408,178. (50% salary support)

3. NIH DK100368-04S1. Minority training supplement. My role: Mentor. 04/01/2017 – 03/31/2019 $156,674.

4. NIH HD096332-01 "Early Menstrual Pain Impact on Multisensory Hypersensitivity" $3,500,000 (42% salary support)

Pending:

R01HD098193 "Mechanistic Characterization of Uterine Pain (M-CUP) to improve diagnosis and treatment for dysmenorrhea" My role: PI. (4%, Impact 13)

HONORS, PRIZES, AND AWARDS

1994 Frank Academic Scholar
1995 University of Wisconsin Honor Society
1997 Neuroscience Training Program award for Outstanding Research in Neurobiology
2000 National Institute of Health, National Research Service Award
2004 Elliot Stellar Scholar
2004 U.W. Madison Neuropsychology Travel Fellowship
2006 American Academy of Sleep Medicine Faculty Research Award
2012 Best abstract on pelvic pain, AAGL Global Congress
2012 Honorable mention poster award, International Pelvic Pain Society
2013 Best abstract on pelvic pain, AAGL Global Congress
2013 Best poster award, International Pelvic Pain Society
2014 New investigator of the year, NorthShore University HealthSystem
2016 Spotlighted abstract, Society for Affective Science
2017 Best paper award, Chicago Gynecological Society
2018 Faculty of 1000 recommended paper: Nonsteroidal antiinflammatory drug resistance in dysmenorrhea: epidemiology, causes, and treatment.
2019 Poster Award: International Association for the Study of Pain—Abdominal and Pelvic Pain SIG

PROFESSIONAL SOCIETIES

Elected or invited membership:
Society for Reproductive Investigation (formerly SGI)
American Academy of Sleep Medicine
Society for Neuroscience
Faculty of 1000

Other:
International Pelvic Pain Society
International Association for the Study of Pain

INVITED SPEAKING

2004	Plenary Lecture	University of Pennsylvania, Philadelphia, PA
2008	Research seminar	University of Chicago
2009	Research seminar	Rosalind Franklin University Medical School
2010	Research seminar	Medical College of Wisconsin
2011	Research seminar	University of North Carolina
2012	Plenary Lecture	International Pelvic Pain Society, Chicago
2012	Research seminar	Sothern Illinois University Medical School
2012	Research seminar	St. Francis Hospital System.
2014	Research seminar	NorthShore Scientific Society
2014	Research seminar	University of Chicago, Department of Obstetrics and Gynecology
2014	Research seminar	AAGL, Las Vegas
2016	Research seminar	Northshore University HealthSystem
2016	Research seminar	AAGL, Washington DC
2017	Research seminar	Loyola University of Chicago
2017	Research seminar	University of Illinois Chicago
2017	Research seminar	University of Michigan
2017	Research seminar	Department of Psychiatry, RUSH University Medical Center, Chicago IL
2018	Plenary Lecture	International Pelvic Pain Society
2018	Symposium/Webinar	International Association for Study of Pain
2019	Research seminar	Northshore University HealthSystem

SERVICE

Extramural

2009-2011	Councilor—Society for Neuroscience Chicago Chapter
2016	Grant Reviewer, US-Israel Binational Science Foundation
2016	Grant Reviewer, Austrian Science Fund
Various	ad hoc reviewer for American Journal of Obstetrics & Gynecology, American Journal of Physiology, Anesthesiology, Brain Research, Molecular Pain, Elife, Environmental Research, Journal of Neurophysiology, Journal of Neuroscience Methods, Journal of Pain, Journal of Visual Experiments, Neuroimage, Neuroscience, PAIN, Physiology & Behavior, PLoS ONE
2019	NIH Study Section ZRG1 IFCN N 55: Discovery and Validation of Novel Safe Effective Pain Treatments

Intramural (Penn)

2002	Journal Club coordinator
2003	Minority Outreach
2004	Curriculum Committee, University of Pennsylvania

Intramural (Northshore & University of Chicago)

2012	Symposium Organizer and Moderator on “Translational Optogenetics”
2012-2013	Pain Journal Club (between 5-10 participants every Wednesday)
	NorthShore IRB Committee on Informed Consent
2014-	NorthShore Pilot Grant Review Committee
2015-	NorthShore Institutional Animal Care and Use Committee
2018-	NorthShore Research Institute Staff Onboarding Committee

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EDUCATIONAL SERVICE

The University of Pennsylvania (B.A., B.S.):

2001-2002 Teaching Assistant, Biology, University of Pennsylvania
2003-2004 Teaching Assistant, Neurobiology, University of Pennsylvania

Courses at the University of Chicago

2013- Cluster group leader – Summer Research Program, Pritzker School of Medicine
2015- Mentor for Evidence Based Medicine presentations – University of Chicago Resident Physician program
2018- Neuroscience of Pain and Opioids, MS4 elective, Pritzker School of Medicine

Continuing medical education:

2010- Annual lecture on pelvic pain as part of the NorthShore Obstetrics and Gynecology departmental grand rounds.

*Research trainees: [note italics designate co-author of poster, * designates paper co-authorship]*

High school students and teachers

2009-2010 Multiple students and high school teachers (20+)—Department of Anesthesiology, University of Chicago: Course on Neurobiology as part of an educational grant from the American Recovery and Reinvestment Act of 2009

2014- Stevenson High School, SPARK: Summer scientific Internship Program. I have had 5 high school students perform academic internships in my laboratory. Among them, *Saaniya Farhan** and *Nathan Shlobin** are coauthors on publications for valuable contributions. Saaniya Farhan (Penn state-TJU), Nathan Shlobin (Northwestern), and Christy Kang (UIC) are now combined undergraduate-MD students.

Undergraduate (B.A., B.S.)

2005-2006 *Eric Ohlson*, Research project on pain. Currently medical student at University of Arizona

Ohlson E, Mendez-Duartes MA, Mendelson SJ, Hellman KM, Mason P. Naloxone methiodide pre-treatment attenuates respiratory depression consequent to systemic morphine. Society for Neuroscience, Washington DC, November 2008.

2005-2006 James Russel, Research project on respiration.

Hellman KM, Mendelson SJ, M Mendez-Duartes, J Russel, E Ohlson, P. Mason. Naloxone methiodide pre-treatment attenuates respiratory depression consequent to systemic morphine. Society for Neuroscience, Washington DC, November 2008.

2006-2007 *Aaron Lambert**, Currently Postdoctoral Scientist at Harvard.

2008-2009 Nasya Mendoza-Elias, research project on respiration, University of Chicago. Entering residency in neurosurgery at Mayo

2008-2009 *Marco Mendez-Duarte**, research project on respiration, University of Chicago.

Hellman KM, Mendelson SJ, M Mendez-Duartes, J Russel, E Ohlson, P. Mason. Naloxone methiodide pre-treatment attenuates respiratory depression consequent to systemic morphine. Society for Neuroscience, Washington DC, November 2008.

2009-2010 *Shaun Teo*, University of Chicago. Graduated with Research Honors. Presently graduate student at The Rockefeller University

Teo S, Khosla N, Hellman KM, Mason P. A potential role for nociceptive-modulatory neurons in the raphe magnus in intradermal serotonin-induced hyperalgesia Society for Neuroscience, San Diego, November 2010

2009 *Natalia Khosla*, Currently medical student at University of Chicago

Teo S, Khosla N, Hellman KM, Mason P. A potential role for nociceptive-modulatory neurons in the raphe magnus in intradermal serotonin-induced hyperalgesia Society for Neuroscience, San Diego, November 2010

2011 Van Sandwick, Research project on pain. Currently consultant at Trinity Partners

Hellman KM, Carrow J, Sandiwck V,Yu P, Edelmith, Segel C, Tu FF. Deciphering the role of uterine contractility in and blood perfusion in uterine pain. International Pelvic Pain Society, Chicago, October 2011.

2011 Jake Carrow. Research project on optics/pain. Currently Ph.D. candidate at Texas A&M

Hellman KM, Carrow J, Sandiwck V,Yu P, Edelmith, Segel C, Tu FF. Deciphering the role of uterine contractility in and blood perfusion in uterine pain. International Pelvic Pain Society, Chicago, October 2011.

2010-2012 *Peter Yu**, research project on uterine pain. Presently medical student at Ohio State University

Hellman KM, Yu P, Segel S, Tu FF. Channelrhodopsin stimulation demonstrates a role for brainstem modulation in uterine nociceptive physiology, New Orleans, November 2012

2011-2012 *Allyson Westling** research project on uterine pain. Presently medical student at Tufts

Westling A, Tu FF, Griffith J, Hellman KM. Severity of dysmenorrhea is correlated with overall elevated pain report. Society for Gynecological Investigation, San Diego, March 2012

2012-2013 *Alice Han**, research project on uterine pain. Presently medical student at University of Illinois

2011-2013 *Chaya Segel**, research project on uterine pain, presently licensed speech pathologist.

Hellman KM, Yu P, Segel S, Tu FF. Channelrhodopsin stimulation demonstrates a role for brainstem modulation in uterine nociceptive physiology, New Orleans, November 2012

2014- *Nathan Shlobin**, research project on MRI of uterine pain. Presently in combined undergraduate/ medical school program at Northwestern University

2015-2017 *Julia Kane**, Research project on bladder pain. Presently student in educational psychology.

Tu F, Hellman KM, Kane J, Resnick J, Pozolo K, Borushko, E A novel visceral sensitivity task evaluates bladder hyperalgesia independent of psychological factors. International Association for the Study of Pain 15th World Congress on Pain, Buenos Aires, Argentina, August 2014

2015-2017 *Katlyn Dillane**, Research project on MRI & EEG in dysmenorrhea. Presently student in master's program for international epidemiology.

Dillane K, Harte SE, Polnazsek K, Tu FF, Silton RL, Hellman KM, Neural correlates of sensory amplification in dysmenorrhea and other visceral pain conditions, Society for Neuroscience, October 2015.

Medical (M.D.)

2007-2008 *Scott Mendelson*,* University of Chicago. Currently a Fellow in Neurology at UCLA.

Hellman KM, Mendelson SJ, Mason P. Nonserotonergic neurons within the raphe magnus regulate respiratory rate and contribute to opioidergic respiratory depression. Society for Neuroscience, San Diego, November 2007

2013-2015 *Nita Padavil*, University of Chicago. Science & Discovery Track mentorship. Current Psychiatry Resident at Northwestern

Padavil N, Tu F, Hellman KM, Alterations In Vaginal Pain Sensitivity In Women With Dyspareunia Independent Of Psychological Factor. Sexual Medicine, Orlando 2015

2014-2018 *Rebecca Zuckerman*,* University of Chicago. Summer Research Program mentorship.

Zuckerman R, Kane J, Silton RL, Hellman KM, Tu FF, Somatic complaint in dysmenorrhea and other visceral pains, Society for Neuroscience, October 2015.

2015- *Carrie Kuhn**, University of Chicago. Awarded Calvin Fentress Fellowship to study mechanisms of menstrual pain in my laboratory. Currently resident in Ob/Gyn at University of Chicago

Kuhn, C, Senapati, SS, Tu, FF, Hellman, KM. The relationship between fMRI events resembling sustained uterine contractions and spontaneous menstrual cramping report. International Pelvic Pain Society, Chicago, IL, October 2016

2019- Cody Sain, University of Chicago. Science & Discovery Track mentorship.

Doctoral (PhD)

2015- *Kelly Polnazsek,* Loyola University of Chicago

Polnazsek K, Dillane K, Tu FF, Hellman KM, Silton RL. The effects of depression, dysmenorrhea, and sensory amplification on resting state brain activity. Society for Neuroscience, Chicago, October 2015.

2017- *Avisek Datta*,* Research project on bladder pain sensitivity in dysmenorrhea, University of Illinois Chicago

Postdoctoral

2012-2014 Adam Gafni-Kane MD, Research Project on interstitial cystitis, Urogynecological Fellowship, University of Chicago

2013-2015 *Insiyyah Patanwala MD**, Research project on quantitative sensory testing in pelvic pain, Assistant Professor, Indiana University

Patanwala I, Tu FF, Borushko E, Pozolo K, Hellman KM. Utility of combining clinical palpation and quantitative sensory testing in evaluation of chronic pelvic pain syndromes. International Pelvic Pain Society, Orlando October 2013

2013-2015 *Sarah Conduit-Hulbert/Wilkinson MD*, Research project on hormonal transcriptional factors in pelvic pain, Resident Physician, University of Chicago

2014-2016 *Jennifer Rosenbaum MD*, Resident Physician, University of Chicago

Rosenbaum, J, Kuhn, C, Tu, FF, Hellman, KM. Ultrasonographic investigation of the mechanisms involved in menstrual cramps. Abstract published in Journal of Minimally Invasive Gynecology Nov-Dec;22(6S):S16. American Association of Gynecologic Laparoscopists 45th Global Congress of Minimally Invasive Gynecology, Los Vegas 2015.

2015- *Diana X. Zhou MD**, Research project on MRI analysis of pelvic pain, Resident Physician, University of Chicago

2016- *Folabomi A. Oladosu PhD*,* Research project on mechanisms of NSAID resistance, Postdoctoral Scholar, University of Chicago

Oladosu, F, Gebhart, G, Garrison, E, Steiner, N, Tu, F, Hellman, K. Menstrual pain unresponsive to naproxen is related to low naproxen serum levels. 3rd World Congress on Abdominal and Pelvic Pain Annual Meeting, Washington, D.C. 2017

2017- *Katharina Laus MD*, Resident Physician, University of Chicago.

Laus, K, Gebhart, G, Garrison, E, Steiner, N, Tu, F, Hellman, K. Noninvasive objective measurement of uterine perfusion/ oxygenation and the effects of naproxen. 3rd World Congress on Abdominal and Pelvic Pain Annual Meeting, Washington, D.C. 2017

2018- *Richard Cockrum* MD, Research Project on doppler ultrasound, Resident Physician, University of Chicago