

Curriculum Vitae

Michael Numan

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Professional Address

Department of Psychology
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Education

<u>Institution</u>	<u>Dates Attended</u>	<u>Degree</u>	<u>Field</u>
Brooklyn College	1963-1969	B.S.	Psychology
City University of New York	1969-1970		Biopsychology
University of Chicago	1970-1973	Ph.D.	Biopsychology

Postdoctoral Training

Rutgers University 1973-1974 Research Associate
Rutgers University 1974-1975 NIH Postdoctoral Fellow

Academic Positions

Assistant Professor - Psychology: Boston College. 1975-1981.

Associate Professor - Psychology: Boston College. 1981-1987.

Visiting Associate - Neurobiology and Behavior: Rockefeller University. 1982-1983.
Professor (Sabbatical)

Professor - Psychology: Boston College. 1987-present.

Visiting Professor- Anatomy and Cell Biology: Harvard Medical School. Fall, 1988.
(Sabbatical)

Visiting Iberdrola - Psychobiology: Universidad Nacional de Educacion a Distancia.
Professor Madrid, SPAIN, Spring-Summer, 1998.

Honors

Elected to Phi Beta Kappa

NIH Postdoctoral Fellowship: HD00250

7/74-6/75

Irene and Eric Simon Foundation for Brain Research Award for Exemplary
Neuroscience Professors: 2007

Research Awards

NIH Research Grant Award: R01-HD10395-01-02 1/77-12/78
Maternal Behavior: Neural Site of Progesterone Action
Total Award: \$21,514

NIH Research Grant Award: R01-HD10395-03-04-05 9/79-8/82
Maternal Behavior: Neural and Hormonal Basis
Total Award: \$122,982

NIH Research Award for Senior Fellows: F33-HD06377 9/82-3/83
[Allowed me to engage in research at
The Rockefeller University with
Drs. Donald Pfaff and Joan Morrell]
Total Award: \$21,515

NIH Research Grant Award: R01-HD18904-01-02-03 9/84-8/88
Neural Basis of Maternal Behavior
Total Award: \$296,062

Whitehall Foundation Research Grant Award 2/90-2/93
Preoptic Area Neural Circuitry and Maternal Behavior
Total Award: \$104,000

NSF Research Grant Award: IBN-9319315 1/94-1/98
Preoptic Area Neuroanatomy and Maternal Behavior
Total Award: \$398,688

NSF Research Grant Award: IBN-9728758 9/98-8/02
Neural Basis of Maternal Behavior
Total Award: \$179,716

NSF Research Grant Award: IBN-0312380 9/03-8/08
Interactions between medial preoptic area,
nucleus accumbens, and ventral pallidum in the
control of mammalian maternal behavior.
Total Award: \$460,054

Professional Affiliations

American Association for the Advancement of Science
Society for Behavioral Neuroendocrinology
Society for Neuroscience

Publications

1. BOOKS

Numan, M., & Insel T.R. (2003). *The Neurobiology of Parental Behavior*. New York: Springer-Verlag.

2. INVITED REVIEWS AND CHAPTERS IN BOOKS OR JOURNALS

Numan, M. (1983). Brain mechanisms of maternal behavior in the rat. In J. Balthazart, E. Prove, & R. Gilles (Eds.), *Hormones and Behaviour in Higher Vertebrates*. Berlin: Springer-Verlag, pp.69-85.

Numan, M. (1985). Brain mechanisms and parental behavior. In N. Adler, D. Pfaff, & R. Goy (Eds.), *Neurobiology of Reproduction*. New York: Plenum Press, pp. 537-605.

Numan, M. (1986). The role of the medial preoptic area in the regulation of maternal behavior in the rat. *Annals of the New York Academy of Sciences*, *474*, 226-233.

Numan, M. (1987). Maternal behavior, brain control. In G. Adelman (Ed.), *Encyclopedia of Neuroscience*. Boston: Birkhauser, pp. 616-617.

Numan, M. (1987). Preoptic area neural circuitry relevant to maternal behavior in the rat. In N. Krasnegor, E.M. Blass, M.A. Hofer, & W.P. Smotherman (Eds.), *Perinatal Development*. New York: Academic Press, pp. 275-298.

Numan, M. (1988). Maternal behavior. In E. Knobil & J.D. Neill (Eds.), *The Physiology of Reproduction*. New York: Raven Press, pp. 1569-1645.

Numan, M. (1988). Neural basis of maternal behavior in the rat. *Psychoneuroendocrinology*, *13*, 47-62.

Numan, M. (1990). Neural control of maternal behavior. In N. Krasnegor & R. Bridges (Eds.), *Biological Aspects of Parenting*. New York: Oxford, pp. 231-259.

Numan, M. (1994). Maternal Behavior. In E. Knobil & J.D. Neill (Eds.), *The Physiology of Reproduction, Volume 2*, 2nd edition. New York: Raven Press, pp. 221-302.

Numan, M. (1994). A neural circuitry analysis of maternal behavior in the rat. *Acta Paediatrica*, *83* (Suppl. 397), 19-28.

Numan, M., & Sheehan, T.P. (1997). The neuroanatomical circuitry for mammalian maternal behavior. *Annals of the New York Academy of Sciences*, *807*, 101-125.

Numan, M. (1997). Maternal Behavior-Brain Control. In G. Adelman & B. Smith (Eds.), *Encyclopedia of Neuroscience*, 2nd edition, CD-ROM version. Amsterdam: Elsevier.

- Numan, M.** (1999). Parental Behavior in Mammals. In E. Knobil & J.D. Neill (Eds.), Encyclopedia of Reproduction, Volume 3. San Diego, CA: Academic Press, pp. 50-60.
- Sheehan, T.P., & **Numan, M.** (2000). The septal region and social behavior. In R. Numan (Ed.), The Behavioral Neuroscience of the Septal Region. New York: Springer-Verlag, pp. 179-209.
- Numan, M.** (2003). Maternal Behavior, Brain Control. In G. Adelman & B. Smith (Eds.), Encyclopedia of Neuroscience, 3rd edition, CD-ROM version. Amsterdam: Elsevier.
- Numan, M.** (2004). Maternal behaviors: central integration or independent parallel circuits? Behavioral Neuroscience, 118, 1469-1472.
- Numan, M.**, Fleming, A. S., & Levy, F. (2006). Maternal Behaviors. In J.D. Neill (Ed.), The Physiology of Reproduction, 3rd edition. San Diego: Academic Press, pp. 1921-1993.
- Numan, M.** (2006). Hypothalamic neural circuits regulating maternal responsiveness toward infants. Behavioral and Cognitive Neuroscience Reviews, 5, 163-190.
- Numan, M.** (2007). Motivational systems and the neural circuitry of maternal behavior in the rat. Developmental Psychobiology, 49, 12-21.
- Numan, M.**, & Stolzenberg, D.S. (2008). Hypothalamic interaction with the mesolimbic dopamine system and the regulation of maternal responsiveness. In R.S. Bridges (Ed.), The Neurobiology of the Parental Brain. Boston: Academic Press, pp. 3-22.
- Numan, M.**, & Stolzenberg, D.S. (in press). Medial preoptic area interactions with dopamine neural systems in the control of the onset and maintenance of maternal behavior in rats. Frontiers in Neuroendocrinology.

3. PAPERS APPEARING IN REFEREED JOURNALS

- Moltz, H., Lubin, M., Leon, M., & **Numan, M.** (1970). Hormonal induction of maternal behavior in the ovariectomized nulliparous rat. Physiology and Behavior, 5, 1373-1377.
- Moltz, H., Leon, M., **Numan, M.**, & Lubin, M. (1971). Replacement of progesterone with a phenothiazine in the induction of maternal behavior in the ovariectomized nulliparous rat. Physiology and Behavior, 6, 735-737.
- Numan, M.**, Leon, M., & Moltz, H. (1972). Interference with prolactin release and the maternal behavior of female rats. Hormones and Behavior, 3, 29-38.
- Lubin, M., Leon, M., Moltz, H., & **Numan, M.** (1972). Hormones and maternal behavior in the male rat. Hormones and Behavior, 3, 369-374.

- Leon, M., **Numan, M.**, & Moltz, H. (1973). Maternal behavior in the rat: Facilitation through gonadectomy. Science, 179, 1018-1019.
- Numan, M.** (1974). The medial preoptic area and maternal behavior in the female rat. Journal of Comparative and Physiological Psychology, 87, 746-759.
- Leon, M., **Numan, M.**, & Chan, A. (1975). Adrenal inhibition of maternal behavior in the rat. Hormones and Behavior, 6, 165-172.
- Numan, M.**, Rosenblatt, J.S., & Komisaruk, B.R. (1977). The medial preoptic area and the onset of maternal behavior in the rat. Journal of Comparative and Physiological Psychology, 91, 146-164.
- Numan, M.** (1978). Progesterone inhibition of maternal behavior in the rat. Hormones and Behavior, 11, 209-231.
- Numan, M.**, & Callahan, E.C. (1980). The connections of the medial preoptic region and maternal behavior in the rat. Physiology and Behavior, 25, 653-665.
- Numan, M.**, & Nagle, D.S. (1983). Preoptic area and substantia nigra interact in the control of maternal behavior in the rat. Behavioral Neuroscience, 97, 120-137.
- Numan, M.**, & Smith, H.G. (1984). Maternal behavior in rats: Evidence for the involvement of preoptic projections to the ventral tegmental area. Behavioral Neuroscience, 98, 712-727.
- Numan, M.**, & Corodimas, K.P. (1985). The effects of paraventricular hypothalamic lesions on maternal behavior in rats. Physiology and Behavior, 35, 417-425.
- Numan, M.**, Morrell, J.I., & Pfaff, D.W. (1985). Anatomical identification of neurons in selected brain regions associated with maternal behavior deficits induced by knife cuts of the lateral hypothalamus in rats. Journal of Comparative Neurology, 237, 552-564.
- Numan, M.**, Corodimas, K.P., Numan, M.J., Factor, E.M., & Piers, W.D. (1988). Axon-sparing lesions of the preoptic area and substantia innominata disrupt maternal behavior in rats. Behavioral Neuroscience, 102, 381-396.
- Numan, M.** (1990). Long-term effects of preoptic area knife cuts on the maternal behavior of rats. Behavioral and Neural Biology, 53, 284-290.
- Bridges, R.S., **Numan, M.**, Ronsheim, P.M., Mann, P.E., & Lupini, C.E. (1990). Central prolactin infusions stimulate maternal behavior in steroid-treated, nulliparous female rats. Proceedings of the National Academy of Sciences, USA, 87, 8003-8007.

- Numan, M.,** McSparren, J., & Numan, M.J. (1990). Dorsolateral connections of the medial preoptic area and maternal behavior in rats. Behavioral Neuroscience, 104, 964-979.
- Numan, M.,** & Numan, M.J. (1991). Preoptic-brainstem connections and maternal behavior in rats. Behavioral Neuroscience, 105, 1013-1029.
- Numan, M.,** Numan, M.J., & English, J.B. (1993). Excitotoxic amino acid injections into the medial amygdala facilitate maternal behavior in virgin female rats. Hormones and Behavior, 27, 56-81.
- Numan, M.,** & Numan, M.J. (1994). Expression of Fos-like immunoreactivity in the preoptic area of maternally behaving virgin and postpartum rats. Behavioral Neuroscience, 108, 379-394.
- Numan, M.,** & Numan, M.J. (1995). The importance of pup-related sensory inputs and maternal performance for the expression of Fos-like immunoreactivity in the preoptic area and ventral bed nucleus of the stria terminalis of postpartum rats. Behavioral Neuroscience, 109, 135-149.
- Numan, M.,** & Numan, M.J. (1996). A lesion and neuroanatomical tract-tracing analysis of the role of the bed nucleus of the stria terminalis in retrieval behavior and other aspects of maternal responsiveness in rats. Developmental Psychobiology, 29, 23-51.
- Numan, M.,** & Numan, M.J. (1997). Projection sites of medial preoptic and ventral bed nucleus of stria terminalis neurons that express Fos during maternal behavior in female rats. Journal of Neuroendocrinology, 9, 369-384.
- Sheehan, T.P., & **Numan, M.** (1997). Microinjection of the tachykinin neuropeptide K into the ventromedial hypothalamus disrupts the hormonal onset of maternal behavior in female rats. Journal of Neuroendocrinology, 9, 677-687.
- Numan, M.,** Numan, M.J., Marzella, S.R., & Palumbo, A. (1998). Expression of c-fos, fos B, and egr-1 in the medial preoptic area and bed nucleus of the stria terminalis during maternal behavior in rats. Brain Research, 792, 348-352.
- Numan, M.,** Roach, J. K., del Cerro, M. C. R., Guillamon, A., Segovia, S., Sheehan, T. P., & Numan, M. J. (1999). Expression of intracellular progesterone receptors in rat brain during different reproductive states, and involvement in maternal behavior. Brain Research, 830, 358-371.
- Sheehan, T.P., Cirrito, J., Numan, M. J., & **Numan, M.** (2000). Using c-Fos immunocytochemistry to identify forebrain regions that may inhibit maternal behavior in rats. Behavioral Neuroscience, 114, 337-352.
- Stack, E.C., & **Numan, M.** (2000). The temporal course of expression of c-Fos and Fos B within the medial preoptic area and other brain regions of postpartum rats

during prolonged mother-young interactions. Behavioral Neuroscience, 114, 609-622.

Sheehan, T.P., Paul, M., Amaral, E., Numan, M. J., & **Numan, M.** (2001). Evidence that the medial amygdala projects to the anterior/ventromedial hypothalamic nuclei to inhibit maternal behavior in rats. Neuroscience, 106, 341-356.

Sheehan, T., **Numan, M.** (2002). Estrogen, progesterone, and pregnancy termination alter neural activity in brain regions that control maternal behavior in rats. Neuroendocrinology, 75, 12-23.

Stack, E. C., Balakrishnan, R., Numan, M. J., & **Numan, M.** (2002). A functional neuroanatomical investigation of the role of the medial preoptic area in neural circuits regulating maternal behavior. Behavioural Brain Research, 131, 17-36.

Numan, M., Numan, M. J., Schwarz, J. M., Neuner, C. M., Flood, T. F., & Smith, C. D. (2005). Medial preoptic area interactions with the nucleus accumbens-ventral pallidum circuit and maternal behavior in rats. Behavioural Brain Research, 158, 53-68.

Febo, M., **Numan, M.**, & Ferris, C. F. (2005). Functional MRI shows oxytocin activates brain regions associated with mother-pup bonding during suckling. Journal of Neuroscience, 25, 11637-11644.

Numan, M., Numan, M. J., Pliakou, N., Stolzenberg, D. S., Mullins, O. J., Murphy, J. M., & Smith, C. D. (2005). The effects of D1 or D2 dopamine receptor antagonism in the medial preoptic area, ventral pallidum, or nucleus accumbens on the maternal retrieval response and other aspects of maternal behavior in rats. Behavioral Neuroscience, 119, 1588-1604.

Stolzenberg, D. S., McKenna, J. B., Keough, S., Hancock, R., Numan, M. J., & **Numan, M.** (2007). Dopamine D1 receptor stimulation of the nucleus accumbens or the medial preoptic area promotes the onset of maternal behavior in pregnancy-terminated rats. Behavioral Neuroscience, 121, 907-919.

Febo, M., Stolberg, T. L., **Numan, M.**, Bridges, R. S., Kulkarni, P., & Ferris, C. F. (2008). Nursing stimulation is more than tactile sensation: It is a multisensory experience. Hormones and Behavior, 54, 330-339.

Invited Addresses Given at Scientific Symposia

Numan, M. Brain mechanisms of maternal behavior in the rat. Symposium on Hormones and Behaviour in Higher Vertebrates, Bielefeld, WEST GERMANY, September, 1982.

Numan, M. The role of the medial preoptic area in the regulation of maternal behavior in the rat. Symposium Held in Honor of Jay S. Rosenblatt, Rutgers University, June, 1984.

- Numan, M. Neural control of maternal behavior. National Institute of Child Health and Human Development sponsored symposium on Psychobiological Aspects of Behavioral Development, Leesburg, VA, September, 1985.
- Numan, M. Neural control of maternal behavior. National Institute of Child Health and Human Development sponsored symposium on Biological Aspects of Parenting, Leesburg, VA, September, 1987.
- Numan, M. Neural control of maternal behavior. National Institute of Mental Health sponsored workshop on Psychobiology of Parental Attachment, Washington, D.C., May, 1989.
- Numan, M. Preoptic area neural circuitry and maternal behavior in rats. Symposium on New Developments in the Study of Maternal Behavior. Held at Conference on Reproductive Behavior, Emory University, Atlanta, GA, June, 1990.
- Numan, M. A neural circuitry analysis of maternal behaviour in the rat. Symposium on The Neurobiology of Infant-Parent Interaction in the Newborn Period, Wenner-Gren Center, Stockholm, SWEDEN, November, 1991.
- Numan, M. Symposium Organizer: Neural, Neurochemical, and Experiential Determinants of Maternal Behavior. 25th Anniversary of The Conference on Reproductive Behavior, Michigan State University, East Lansing, MI, June, 1993.
- Numan, M. Neural Control of Maternal Behavior. Symposium on Reproductive Behavior, European Neuroscience Association, Madrid, SPAIN, September, 1993.
- Numan, M. The role of the medial preoptic area and its efferents in the control of maternal behavior. Eastern Psychological Association Symposium: What energizes motivated behavior? The roles of the hypothalamus and mesolimbic system. Boston, MA, April, 1995.
- Numan, M. The Neuroanatomical Circuitry of Mammalian Maternal Behavior. The Integrative Neurobiology of Affiliation. A New York Academy Of Sciences Conference, Georgetown University Conference Center, Washington, DC, March 14-17, 1996.
- Numan, M. The Use of Fos Immunocytochemistry to Explore the Neural Circuitry of Maternal Behavior. The Conference on Reproductive Behavior, Concordia University, Montreal, CANADA, June, 1996.
- Numan, M., Sheehan, T.P., & Stack, E.C. Expression of Fos Genes in the Brain and Maternal Behavior. Symposium on Maternal Behavior, Behavioral Neuroscience Session. INABIS Internet World Congress on Biomedical Sciences, December, 1998.

- Numan, M., Sheehan, T.P., & Stack, E.C., & Numan, M.J. Fos Genes: A Window to the Neural Circuitry and Molecular Neurobiology of Maternal Behavior. Society for Behavioral Neuroendocrinology, University of Virginia, Charlottesville, VA, June, 1999.
- Numan, M. Expression of Fos Genes in the Brain and Maternal Behavior. Symposium on the Brain and Motivated Behavior. American Psychological Association Meeting, Boston, MA, August, 1999.
- Numan, M. The Functional Neuroanatomy of Maternal Behavior. Symposium on the Neurobiology of Maternal Behavior, Center for Behavioral Neuroscience, Emory University, Atlanta, GA, April 20, 2002.
- Numan, M. Neural Circuits Regulating the Occurrence of Mammalian Maternal Behavior. Mother-Infant Conference, Montreal, Quebec, CANADA, June 16-19, 2003.
- Numan, M. Motivational Systems and the Neural Circuitry of Maternal Behavior. American Psychological Society Convention, Los Angeles, CA, May 26-29, 2005.
- Numan, M. Motivational Systems and the Neural Circuitry of Maternal Behavior. International Society for Developmental Psychobiology, Washington, DC, November 9-12, 2005.
- Numan, M. Hypothalamic neural circuits and the regulation of maternal motivation. Marce Society International Biennial Scientific Meeting, Keele University Medical School, UK, September 12-15, 2006.
- Numan, M., Stolzenberg, D. S., & Numan, M. J. Hypothalamic interaction with the mesolimbic dopamine system and the regulation of maternal responsiveness. Parental Brain Conference, Boston, MA, June 7-10, 2007.
- Numan, M. Participant in a Roundtable discussion group moderated by Don Pfaff. Sex and Love: The Biology of Romance. The Philoctetes Center, New York, NY, Sept. 20, 2008.

Major Papers Presented at Scientific Meetings

- Numan, M. Estrogenic stimulation of maternal behavior in the rat. Eastern Conference on Reproductive Behavior, Nags Head, North Carolina, June, 1975.
- Numan, M. The medial preoptic area and the onset of maternal behavior in the rat. International Ethology Conference, Parma, ITALY, August, 1975.
- Numan, M. Progesterone inhibition of maternal behavior in the rat. Eastern Conference on Reproductive Behavior, University of Wisconsin, Madison, June, 1978.

- Numan, M. The connections of the medial preoptic region and estrogen facilitated maternal behavior in the rat. Eastern Conference on Reproductive Behavior, Rockefeller University, June, 1980.
- Numan, M. Preoptic-substantia nigra connections and maternal behavior in the rat. Conference on Reproductive Behavior, Vanderbilt University, June 1981.
- Numan, M., Morrell, J.I., & Pfaff, D.W. Preoptic area connectivity relevant to maternal behavior in the rat. 13th Annual Meeting of the Society for Neuroscience, Boston, MA, November, 1983.
- Numan, M., Corodimas, K.P., Numan, M.J., & Piers, W.D. The effects of N-methyl-DL-aspartic acid lesions of the lateral preoptic area on the maternal behavior of postpartum rats. 16th Annual Meeting of the Society for Neuroscience, Washington, D.C., November, 1986.
- Numan, M., McSparren, J., & Numan, M.J. Medial preoptic area afferents and maternal behavior in the rat. 18th Annual Meeting of the Society for Neuroscience, Toronto, CANADA, November, 1988.
- Bridges, R.S., Numan, M., & Ronsheim, P.M. Central prolactin administration stimulates maternal behavior in nulliparous female rats. 19th Annual Meeting of the Society for Neuroscience, Phoenix, Arizona, October, 1989.
- Numan, M. Combined use of knife cuts, HRP histochemistry, and excitotoxic lesions in behavioral neuroscience. Abstract presented at Short Course #2, 19th Annual Meeting of the Society for Neuroscience, Phoenix, Arizona, October, 1989.
- Numan, M., & Lupini, C.E. Preoptic-brainstem connections and maternal behavior in rats. Conference on Reproductive Behavior, Emory University, Atlanta, GA, June, 1990.
- Numan, M., Numan, M.J., & Lupini, C.E. Preoptic area knife cuts and knife cuts posterior to the ventral tegmental area disrupt maternal behavior in rats. 20th Annual Meeting of the Society for Neuroscience, St. Louis, MO, October, 1990.
- Numan, M., Numan, M.J., & English, J.B. Excitotoxic amino acid lesions of the medial amygdala facilitate maternal behavior: mechanism of action. Conference on Reproductive Behavior, Pacific Grove, CA, June, 1991.
- Numan, M., Numan, M.J., & English, J.B. N-methyl aspartic acid injections into the medial amygdala facilitate maternal behavior in rats. 21st Annual Meeting of the Society for Neuroscience, New Orleans, LA, November, 1991.
- Numan, M., & Numan, M.J. Maternal behavior in female rats is associated with increased numbers of Fos containing neurons in the medial preoptic area. 22nd Annual Meeting of the Society for Neuroscience, Anaheim, CA, October, 1992.

- Numan, M., & Numan, M.J. Fos production in preoptic neurons correlated with different aspects of maternal behavior in rats. 23rd Annual Meeting of the Society for Neuroscience, Washington, DC, November, 1993.
- Numan, M., & Numan, M.J. Excitotoxic amino acid lesions of the ventral bed nucleus of the stria terminalis disrupt maternal behavior in rats. 24th Annual Meeting of the Society for Neuroscience, Miami, FL, November, 1994.
- Sheehan, T.P., & Numan, M. Neuropeptide K microinjections into the medial hypothalamus inhibit the hormonal onset of maternal behavior in female rats. Conference on Reproductive Behavior, Boston, MA, June, 1995.
- Numan, M., & Numan, M.J. Projection sites of preoptic and bed nucleus of stria terminalis neurons that express Fos during maternal behavior in female rats. 25th Annual Meeting of the Society for Neuroscience, San Diego, CA, November, 1995.
- Sheehan, T., Stack, E., Numan, M.J., & Numan, M. Microinjection of neuropeptide K into the ventromedial hypothalamus, but not into the mediodorsal thalamus, disrupts the hormonal onset of maternal behavior in female rats. The Conference on Reproductive Behavior, Concordia University, Montreal, CANADA, June, 1996.
- Numan, M., Aviles, S.A., Williams, M.D., Stack, E.C., Sheehan, T.P., & Numan, M.J. Changes in central neurotensin immunoreactivity associated with lactation and maternal behavior in rats. 26th Annual Meeting of the Society for Neuroscience, Washington, DC, November, 1996.
- Sheehan, T.P., Stack, E.C., Numan, M.J., & Numan, M. Differential Fos expression in the brains of maternal and non-maternal virgin female rats exposed to various stimuli. 26th Annual Meeting of the Society for Neuroscience, Washington, DC, November, 1996.
- Numan, M., Numan, M.J., Marzella, S.R., & Palumbo, A. Expression of c-Fos, Fos B, and Egr-1 in medial preoptic area and bed nucleus of stria terminalis during maternal behavior in rats. 27th Annual Meeting of the Society for Neuroscience, New Orleans, LA, October, 1997.
- Numan, M., Numan, M.J., & Roach, J.K. Immunocytochemical detection of progesterone receptor in the rat forebrain during pregnancy and lactation. 28th Annual Meeting of the Society for Neuroscience, Los Angeles, CA, November, 1998.
- Sheehan, T., Paul, M., Cirrito, J., & Numan, M. N-methyl-D-aspartic acid lesions of the medial amygdala facilitate maternal behavior in female rats hysterectomized and ovariectomized on day 12 of pregnancy. 28th Annual Meeting of the Society for Neuroscience, Los Angeles, CA, November, 1998.

- Stack, E.C., & Numan, M. Temporal course of expression of c-Fos and Fos B in the medial preoptic area and other brain regions of postpartum rats after prolonged interactions with young. 28th Annual Meeting of the Society for Neuroscience, Los Angeles, CA, November, 1998.
- Sheehan, T., & Numan, M. Utilizing c-Fos immunocytochemistry to identify brain regions that may inhibit maternal behavior in rats. Society for Behavioral Neuroendocrinology, University of Virginia, Charlottesville, VA, June, 1999.
- Sheehan, T., & Numan, M. Utilizing c-Fos immunocytochemistry to identify brain regions that may inhibit maternal behavior in rats. 29th Annual Meeting of the Society for Neuroscience, Miami, FL, October, 1999.
- Stack, E. C., Numan, M. J., & Numan, M. Correlations between medial preoptic area cFos-positive neurons and neural systems relevant to maternal behavior. Society for Behavioral Neuroendocrinology, Madrid, Spain, August, 2000.
- Sheehan, T, Amaral, E., & Numan, M. The anterior hypothalamic nucleus is downstream of the medial amygdala in a circuit that inhibits maternal behavior in rats. 30th Annual Meeting of the Society for Neuroscience, New Orleans, LA, November, 2000.
- Stack, E. C., Numan, M. J., & Numan, M. Medial preoptic area cFos expression and its role in neural systems relevant to maternal behavior. 30th Annual Meeting of the Society for Neuroscience, New Orleans, LA, November, 2000.
- Stack, E. C., Numan, M. J., & Numan, M. The effects of bilateral lesions of the shell of the nucleus accumbens on maternal behavior in the rat. 31th Annual Meeting of the Society for Neuroscience, San Diego, CA, November, 2001.
- Numan, M., Numan, M. J., Neuner, C. M., Smith, C.D. Microinjection of muscimol into the ventral pallidum, but not into the nucleus accumbens, disrupts maternal behavior in lactating rats. 33rd Annual Meeting of the Society for Neuroscience, New Orleans, LA, November, 2003.
- Numan, M., Smith, C. D., Flood, T. F., & Numan, M. J. Interaction between the medial preoptic area and the ventral pallidum in the control of maternal behavior in rats. Society for Behavioral Neuroendocrinology, Lisbon, Portugal, July, 2004.
- Numan, M., Numan, M. J., Flood, T. F., & Smith, C. D. A Neu N immunocytochemical analysis of asymmetrical lesions of the medial preoptic area and ventral pallidum supports their interaction in the regulation of maternal behavior in rats. 34th Annual Meeting of the Society for Neuroscience, San Diego, CA, October, 2004.
- Kulkarni, P. P., Sullivan, J. M., Febo, M., Numan, M., Harder, J. A., Messenger, T. L., Bridges, R., & Ferris, C. F. Functional magnetic resonance imaging reveals pup suckling selectively activates the olfactory system over other sensory modalities.

35th Annual Meeting of the Society for Neuroscience, Washington, D. C., November, 2005.

Numan, M., Stolzenberg, D. S., Pliakou, N., Smith, C. D., Mullins, O. J., Murphy, J. M., & Numan, M. J. The effects of D1 or D2 receptor antagonism in the medial preoptic area, ventral pallidum, or nucleus accumbens on the maternal behavior of postpartum rats. 35th Annual Meeting of the Society for Neuroscience, Washington, D. C., November, 2005.

Stolzenberg, D. S., & Numan, M. Microinjection of a dopamine D1 receptor agonist into the nucleus accumbens stimulates maternal behavior in pregnancy-terminated rats. Annual Meeting of the Society for Behavioral Neuroendocrinology, Pittsburgh, PA., June, 2006.

Stolzenberg, D. S., Numan, M. J., & Numan, M. Dopamine D1 receptor stimulation of nucleus accumbens promotes maternal behavior in pregnancy-terminated rats. 36th Annual Meeting of the Society for Neuroscience, Atlanta, GA., October, 2006.

Stolzenberg, D. S., Numan, M. J., & Numan, M. Dopamine D1 receptor stimulation of the nucleus accumbens or medial preoptic area promotes the onset of maternal behavior in pregnancy-terminated rats. Parental Brain Conference, Boston, MA, June 7-10, 2007.

Numan, M., Stolzenberg, D. S., Delleveigne, A. A., Correnti, C. M., & Numan, M. J. Temporary inactivation of ventral tegmental area neurons reversibly disrupts maternal behavior in postpartum rats. 37th Annual Meeting of the Society for Neuroscience, San Diego, CA., November, 2007.

Stolzenberg, D.S., Zhang, K.Y., Luskin, K.A., Numan, M. Acute injection of estradiol at the time of pup presentation facilitates maternal behavior in pregnancy-terminated rats. 38th Annual Meeting of the Society for Neuroscience, Washington, DC., November, 2008.

Invited Addresses Given at University Seminar Series

Numan, M. Brain mechanisms of maternal behavior in the rat. Rockefeller University Seminar Series on the Neurobiology of Behavior, January, 1981.

Numan, M. Brain mechanisms of maternal behavior in the rat. Institute of Animal Behavior, Rutgers University, December, 1982.

Numan, M. Preoptic area neural circuitry underlying maternal behavior. Psychobiology Seminar Series, Harvard Medical School, February, 1984.

Numan, M. Brain mechanisms of maternal behavior in the rat. Boston University - Biology Department Seminar Series on Ecology and Behavior, March, 1985.

- Numan, M. Brain mechanisms of maternal behavior in the rat. University of Massachusetts at Amherst Psychobiology Seminar Series, October, 1986.
- Numan, M. Brain mechanisms of maternal behavior in the rat. Institute of Animal Behavior- Rutgers University, February, 1987.
- Numan, M. Brain mechanisms of maternal behavior in the rat. Presentation at Seminar Series on the Neurobiology of Reproductive Behavior, University of Texas, Austin, March, 1987.
- Numan, M. Brain mechanisms of maternal behavior in the rat. Tufts University - Psychology Seminar Series, November, 1987.
- Numan, M. Neural basis of maternal behavior. Rockefeller University Field Center- Seminar Series, October, 1988.
- Numan, M. Neural basis of maternal behavior. Concordia University - Hormones and Behavior Seminar Series, Montreal, Quebec, CANADA, March, 1990.
- Numan, M. Facilitatory and inhibitory neural mechanisms regulating maternal behavior. College of the Holy Cross-Psychology Department Seminar Series, Worcester, MA, February, 1997.
- Numan, M. Neural basis of maternal behavior. Department of Psychobiology, UNED, Madrid, SPAIN, June, 1998.
- Numan, M. Neural basis of maternal behavior. Cajal Institute-Seminar Series, Madrid, SPAIN, July, 1998.
- Numan, M. Neural circuits regulating mammalian maternal behavior. Bowdoin College Neuroscience Department Seminar Series. Brunswick, ME, April, 2004.
- Numan, M. Hypothalamic neural circuits regulating mammalian maternal behavior. Brown University Psychology Department Seminar Series. Providence, RI, October, 2006.
- Numan, M. Brain mechanisms regulating maternal motivation in mammals. Evolution and Human Adaptation Program, University of Michigan, Ann Arbor, April 3, 2008.

Editorial, Consulting, and Reviewing Work

1. Consulting Editor for Hormones and Behavior: 1991-1996.
2. Ad hoc reviewer for the following journals: Physiology and Behavior; Journal of Comparative Neurology; Journal of Comparative Psychology; Brain Research; Psychopharmacology; Behavioural Brain Research; Science; Experimental Brain Research; Behavioral and Neural Biology; Endocrinology; Animal Behaviour; Behavioral Neuroscience; European Journal of Neuroscience; Neuroscience and

- Biobehavioral Reviews; Psychoneuroendocrinology; Developmental Psychobiology; Journal of Neuroscience; Brain Research Bulletin; Hormones and Behavior; Proceedings of the National Academy of Sciences, USA; Pharmacology, Biochemistry, and Behavior; Nature Reviews Neuroscience; Biological Psychiatry; Frontiers in Neuroendocrinology.
3. I have reviewed grant applications for NASA, NIH, NIMH, NSF, Medical Research Council of Canada, NSERC of Canada.
 4. Member, NASA Space Life Sciences Developmental Biology Review Panel, August-December, 1998.

Courses Taught at Boston College

1. Introductory Psychology I
2. Physiological Psychology/Behavioral Neuroscience
3. Research Methods: Physiological Psychology
4. Hormones and Behavior
5. Evolution of Behavior
6. Advanced Physiological Psychology
7. Introduction to Neuroscience

Major Departmental Administrative Contributions

1. Development of Undergraduate Biopsychology Program (with P. Gray) [Beginning in 1975].
2. Development of Graduate Biopsychology Program [Beginning in 1989].
3. Spearheaded the development of an Interdisciplinary (Biology, Psychology) Neuroscience Program at Graduate Level. The Program was implemented in 2004.
4. Chair of Behavioral Neuroscience Search Committee: 1987, 1990, 1998, 2000, 2002, 2006.

Major University Committee Assignments

1. University Animal Care and Use Committee:1977- 1997
2. University Research Council:1987- 1990

Graduate Students

Teige P. Sheehan, as of Fall, 1995. Ph.D. received August 2000.
Edward C. Stack, as of Spring, 1996. Ph.D. received May 2002.
Natalia Pliakou, as of Fall, 2004. M. A. received May 2006.
Danielle Stolzenberg, as of Fall, 2004.

Member of the Graduate Dissertation Committees of the Following Graduate Students

Marie Gibson-Rutgers University
Anthony Giordano-Rutgers University
Christine Lisciotto-Tufts University
Cheryl Frye-Tufts University (Masters Thesis)
Ellen Flaven-Boston College (Biology)
Scott Wersinger-Boston University
Mikhail Kalinichev-Rutgers University
Liz Bless-Boston College (Psychology)

Xiao Tao Jin-Boston College (Biology)
Michael Poderychi-Boston College (Biology; Masters Thesis)
Shannon Harding-Boston College (Psychology)
Hywel Morgan-University of Toronto
Mariana Todorova Tran-Boston College (Biology)
Daniel Olazabal-Rutgers University
Stephanie Fraone-Boston College (Psychology)
Melanie McFadyen-Leussis-Boston College (Psychology)