

CURRICULUM VITAE

Fenfei Leng

Department of Chemistry & Biochemistry
11200 SW 8th Street
Florida International University
Miami, FL 33199

Phone: 305-348-3277
Fax: 305-348-3772
E-mail: lengf@fiu.edu
Web: <http://www.fiu.edu/~lengf/>

1. EDUCATION

| Degree | Institution | Field | Dates |
|--------|---|-----------------|-----------|
| PhD | University of Mississippi Medical Center | Biochemistry | 1993-1997 |
| MS | Nanjing Agriculture University | Plant Pathology | 1986-1989 |
| BS | Nanjing University | Biochemistry | 1982-1986 |

2. FULL-TIME ACADEMIC EXPERIENCE

| Institution | Rank | Field | Dates |
|--|----------------------------------|--------------|--------------|
| Florida International University, Miami, FL | Associate professor (tenured) | Biochemistry | 2007-present |
| Florida International University, Miami, FL | Assistant professor | Biochemistry | 2001-2007 |
| Johns Hopkins University, Baltimore, MD | Postdoctoral fellow | Biochemistry | 1997-2001 |
| Jiangxi Medical College, Nanchang, Jiangxi, China | Lecturer | Biochemistry | 1991-1993 |
| Jiangxi Medical College, Nanchang, Jiangxi, China | Assistant Lecturer | Biochemistry | 1989-1991 |

3. PART-TIME ACADEMIC EXPERIENCE

| Institution | Rank | Field | Dates |
|---|--------------------|-------------------------------------|-----------|
| University of Mississippi Medical Center, Jackson, MS | Graduate Assistant | Biochemistry | 1993-1997 |
| National Cancer Institute | Special Scientist | Biochemistry and Stem Cell Research | 2011-2012 |

4. EMPLOYMENT RECORD AT FIU

| Rank | Dates |
|---------------------------------|--------------|
| Assistant Professor | 2001-2007 |
| Associate Professor with tenure | 2007-Present |

5. PUBLICATIONS IN DISCIPLINE

Books (give full bibliographical references)

N/A

Articles (*corresponding author; underlined> are students that I supervised at FIU)

1. Gu, M., Berrido, A., Gonzalez, W.G., Miksovska, J., Chambers, J., and Leng, F. Fluorescently labeled circular DNA molecules for DNA topology and topoisomerases. *Sci Rep.* **2016**, 6:36006.
2. Muzammil Ahmad, Yutong Xue, Seung Kyu Lee, Jennifer L. Martindale, Weiping Shen, Wen Li, Sige Zou, Maria Ciaramella, H.l.ne Debat, Marc Nadal, **Fenfei Leng**, Hongliang Zhang, Quan Wang, Grace Ee-lu Siaw, Hengyao Niu, Yves Pommier, Myriam Gorospe, Tao-Shih Hsieh, Yukching Tse-Dinh, Dongyi Xu, Weidong Wang.* RNA topoisomerase is prevalent in all domains of life and associates with polyribosomes in animals. *Nucleic Acids Research*, **2016**, 44:6335-49.
3. **Leng, F.*** Protein-induced DNA linking number change by sequence-specific DNA binding proteins and its biological effects. **2016**, *Biophysical reviews*, *in press*.
4. Fulcrand, G., Dages, S., Zhi, X., Chapagain, P., Gerstman, B. S., Dunlap, D., and **Leng, F.*** DNA supercoiling, a critical signal regulating the basal expression of the lac operon in Escherichia coli. *Sci Rep.* **2016**, 6:19243.
5. Fulcrand, G., Chapagain, P., Dunlap, D., and **Leng, F.*** Direct observation of a 91 bp LacI-mediated, negatively supercoiled DNA loop by atomic force microscope. *FEBS Letters*, **2016**, 590, 613-618.

6. Sun, P., Leeson, C., Zhi, X., Leng, F., Pierce, R.H., Henry, M.S., Rein K.S.* Characterization of an epoxide hydrolase from the Florida red tide dinoflagellate, *Karenia brevis*. *Phytochemistry*, **2016**, 122: 11-21.
7. Aloso, N., Guillin, R., Chambers, J, and **Leng, F.*** A rapid, sensitive high throughput screening method to identify compounds targeting protein-nucleic acids interactions. *Nucleic Acids Research*, **2015**, 43(8): e52. **(Impact factor: 9.112)**
8. Frost, L., Baez, M.A.M., Harrilal, C., Garabedian, A., Fernandez-Lima F., and **Leng, F.*** The dimerization state of the mammalian high mobility group protein AT-hook-2 (HMGA2). *PLOS ONE*, 2015, 10(6): e0130478. **(Impact factor: 3.534)**
9. Ding, Y., Manzo, C., Fulcrand, C., **Leng, F.**, Dunlap, D., and Finzi, L.* DNA Supercoiling: a Regulatory Signal for the Lambda Repressor. *Proceedings of the National Academy of Sciences U S A*, **2014**, 111: 15402-15407. **(Impact factor: 9.809)**
10. Ranjan, N., Fulcrand, G., King, A., Brown, J., Jiang, X., **Leng, F.** and Arya, D.* Selective inhibition of bacterial topoisomerase I by alkynyl-bisbenzimidazoles. *Med. Chem. Commun.* **2014**, 5: 816-825. **(Impact factor: 2.626)**
11. Schenk ER, Ridgeway ME, Park MA, **Leng F**, Fernandez-Lima F.* Isomerization kinetics of at hook decapeptide solution structures. *Analytical Chemistry*, **2014**, 86: 1210-1214. **(Impact factor: 5.825)**
12. **Leng, F.*** DNA Bending by Proteins: Utilizing Plasmid pBednAT as a Tool. *Methods Mol Biol.* **2013**, 1054: 267-282. **(Impact factor: 1.29)**
13. Deng T., Zhu Z. L., Zhang, S. **Leng, F.**, Cherukuri, S., Hansen, L., Marino-Ramirez, L., Meshorer, E., Landsman, D., and Bustin, M.* HMGN1 Modulates Nucleosome Occupancy and DNase I Hypersensitivity at the CpG Island Promoters of Embryonic Stem Cells. **2013**, *Mol Cell Biol*, 33: 3377-3389. **(Impact factor: 5.036)**
14. Fulcrand, G., Zhi, X., and **Leng, F.*** Transcription-coupled DNA supercoiling in defined protein systems and in *E. coli topA* mutant strains. **2013**, *IUBMB Life*, 65: 615-622 **(cover story)**. **(Impact factor: 2.755)**
15. Zhi, X. and **Leng, F.*** Dependence of transcription-coupled DNA supercoiling on promoter strength in Escherichia coli topoisomerase I deficient strains. **2013**, *Gene*, 514: 82-90. **(Impact factor: 2.082)**
16. Xu, X., Zhi, X., and **Leng, F.*** Determining DNA Supercoiling Enthalpy by Isothermal Titration Calorimetry. **2012**, *Biochimie*, 94, 2665-2672. **(Impact factor: 3.123)**
17. **Leng, F.***, Chen, B. and Dunlap, D. Dividing a supercoiled DNA molecule into two independent topological domains, *Proceedings of the National Academy of Sciences U S A*, **2011**, 108, 19973-19978. **(Impact factor: 9.809)**
18. Xu, X. and **Leng, F.*** A rapid procedure to purify E. coli DNA topoisomerase I, **2011**, *Protein Expression and Purification*, 77, 214-219. **(Impact factor: 1.508)**
19. Chen, B., Xiao, Y., Liu, C., Li, C., and **Leng, F.*** Protein-Induced DNA Linking Number Change by Sequence-Specific DNA-Binding Proteins. *Nucleic Acids Research*, **2010**, 38, 3643-3654. **(Impact factor: 9.112)**

20. Chen, B., Young, J., and **Leng, F.*** DNA bending by the Mammalian High Mobility Group Protein AT-hook 2. *Biochemistry*, **2010**, 49(8):1590-5. **(Impact factor: 3.194)**
21. Joynt, S., Morillo, V., and **Leng, F.*** Binding the Mammalian High Mobility Group Protein AT-hook 2 to AT-Rich Deoxyoligonucleotides: Enthalpy-Entropy Compensation. *Biophysical Journal*, **2009**, 96(10):4144-52. **(Impact factor: 3.832)**
22. Miao, Y., Cui, T., **Leng, F.**, and Wilson, D. W.* Inhibition of HMGA2 binding to DNA by netropsin: a biosensor-surface plasmon resonance assay. *Analytical Biochemistry*, **2008**, 374: 7-15. **(Impact factor: 2.305)**
23. Cui, T. and **Leng, F.*** Specific Recognition of AT-Rich DNA Sequences by the Mammalian High Mobility Group Protein AT-hook 2: A SELEX Study. *Biochemistry*, **2007**, 46, 13059-13066. **(Impact factor: 3.194)**
24. Samul, R. and **Leng, F.*** Transcription-coupled Hypernegative Supercoiling of Plasmid DNA by T7 RNA Polymerase in Escherichia coli Topoisomerase I-Deficient Strains. *Journal of Molecular Biology*, **2007**, 374, 925-935. **(Impact factor: 3.959)**
25. Cui, T., Joynt, S., Morillo, V., Baez, M., Hua, Z., Wang, X., and **Leng, F.*** "Large Scale Preparation of the Mammalian High Mobility Group Protein A2 for Biophysical Studies." *Protein & Peptide Letters*, **2007**, 14, 87-91. **(Impact factor: 1.735)**
26. Cui, T., Wei, S., Brew, K., and **Leng, F.*** "Energetics of Binding the Mammalian High Mobility Group Protein HMGA2 to poly(dA-dT)₂ and poly(dA)poly(dT)." *Journal of Molecular Biology*, **2005**, 325, 629-645. **(Impact factor: 3.959)**
27. **Leng, F.***, Amado, L., and McMacken, R. "Coupling DNA supercoiling to transcription in defined protein systems." *Journal of Biological Chemistry*, **2004**, 279, 47564-47571. **(Impact factor: 4.600)**
28. **Leng, F.**, Chaires, J.B., and Waring, M.J.* "Energetics of echinomycin binding to DNA" *Nucleic Acids Research*, **2003**, 31, 6191-6197. **(Impact factor: 9.112)**
29. **Leng, F.** and McMacken, R.* "Potent Stimulation of Transcription-coupled DNA Supercoiling by Sequence-Specific DNA-Binding Proteins" *Proceedings of the National Academy of Sciences U S A*, **2002**, 99, 9139-9144. **(Impact factor: 9.809)**
30. **Leng, F.**, Graves, D., and Chaires, J.B.* "Chemical Cross-linking of Ethidium Bromide to DNA" *Biochimica Biophysica Acta*, **1998**, 1442, 71-81. **(Impact factor: 3.829)**
31. **Leng, F.**, Priebe, W., and Chaires, J.B.* "Ultratight DNA Binding of a New Bisintercalating Anthracycline Antibiotic" *Biochemistry*, **1998**, 37, 1743-1753. **(Impact factor: 3.194)**
32. **Leng, F.** and Leno, G.H.* "Daunomycin Disrupts Nuclear Assembly and the Coordinate Initiation of DNA Replication in Xenopus Egg Extracts" *Journal of Cellular Biochemistry*, **1997**, 64, 476-491. **(Impact factor: 3.368)**

33. Chaires, J.B.*, **Leng, F.**, Przewloka, T., Fokt, I., Ling, Y.-H, Perez-Soler, R., and Priebe, W. “Structure Based Designed of a New Bisintercalating Anthracycline Antibiotic” *Journal of Medicinal Chemistry*, **1997**, *40*, 261-266. (**Impact factor: 5.480**)
34. Hu, G., Shui, X., **Leng, F.**, Priebe, W., Chaires, J.B., and Williams, L.D.* “Structure of a DNA-Bisdaunomycin Complex” *Biochemistry*, **1997**, *36*, 5940-5946. (**Impact factor: 3.194**)
35. **Leng, F.**, Savkur, R., Fokt, I., Przewloka, T., Priebe, W., and Chaires, J.B.* “Base Specific and Regioselective Chemical Cross-linking of Daunorubicin to DNA”. *Journal of the American Chemical Society*, **1996**, *118*, 4731-4738. (**Impact factor: 11.444**)

Proceedings

N/A

Chapters in Books

N/A

Government Reports and Monographs

N/A

6. OTHER PUBLICATIONS

N/A

7. PRESENTED PAPERS AND LECTURE

Presentations at Meetings (presented author is underlined; since 2001)

1. Fulcrand, G, Dages, S, Zhi, X., Chapagain, P., Gerstman, B. S., Dunlap, D., and **Leng, F.** (2015) DNA supercoiling is an epigenetic signal to regulate the basal expression of the *lac* operon in *Escherichia coli*. The 59th Annual Meeting of Biophysical Society. Baltimore, MD (poster).
2. **Leng, F.**, Zhi, X., Dages, S, Dages, K., and Makemson (2015) Activating supercoiling-sensitive promoters by transcription-coupled DNA supercoiling in *Escherichia coli*. BIT's 6th World DNA and Genome Day, Nanjing, China (Oral, invited).
3. **Leng, F.** (2014) Activating or inhibiting supercoiling sensitive promoters by transient, dynamic transcription-coupled DNA supercoiling in *Escherichia coli*. DNA Topoisomerases in Biology and Medicine, Gordon Research Conference, Newry, ME (oral and poster).
4. Berrido, A. M., Chen, A., Tse-Dinh, Y., and **Leng, F.** (2014) Biochemical and biophysical properties of positive supercoiled DNA. The 58th Annual Meeting of Biophysical Society. San Francisco, CA (poster).

5. Zhi, X., Perez, C., Dages, S., Dages, K., Eichelbaum, S., Makemson, J., and **Leng, F.** (2014) Activating the prokaryotic leu-500 promoter by transient, dynamic DNA supercoiling in *Escherichia coli*. The 58th Annual Meeting of Biophysical Society. San Francisco, CA (poster).
6. Fulcrand, G., Chen, B., Eichelbaum, S., Dunlap, D., and **Leng, F.** (2013) Lactose repressor functions as a DNA topological barrier in *Escherichia coli lactose operon*. The 57th Annual Meeting of Biophysical Society. Philadelphia, PA (poster).
7. Zhi, X. and **Leng, F.** (2012) Dependence of transcription-coupled DNA supercoiling on promoter strength in *Escherichia coli* topoisomerase I deficient strains. Bacteria, Archaea and Phages meeting, Cold Spring Harbor, NY, USA (poster).
8. Fulcrand, G. and **Leng, F.** (2012) Modulating DNA topology by *E. coli* lac repressor. Bacteria, Archaea and Phages meeting, Cold Spring Harbor, NY, USA (poster).
9. **Leng, F.** and Chen, B. (2011) Dividing a plasmid DNA molecule into two independent topological domains. Mechanisms and Regulation of Prokaryotic Transcription. Saxtons River, Vermont (poster).
10. Zhi, X. and **Leng, F.** (2011) Transcription-coupled hypernegative supercoiling of plasmid DNA by *Escherichia coli* RNA polymerase in *E. coli* topoisomerase I-deficient strains. Mechanisms and Regulation of Prokaryotic Transcription. Saxtons River, Vermont (poster).
11. **Leng, F.**, Joynt, S., Chen, B., and Young, J. (2010) Molecular recognition of AT-rich DNA sequences by the mammalian high mobility group protein AT hook 2, 2010 International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii (lecture).
12. **Leng, F.** (2010) The Fourth Shanghai International Conference on Biophysics and Molecular Biology (invited lecture).
13. **Leng, F.** (2009) Mechanisms of transcription-coupled DNA supercoiling. 21st IUBMB and 12th FAOBMB International Congress of Biochemistry and Molecular Biology, Shanghai, China (invited lecture).
14. **Leng, F.**, S. Joynt, T. Cui, and V. Morillo. (2009) Molecular mechanisms of the mammalian high mobility group protein AT-hook 2 recognizing AT-rich DNA. 7th EBSA European Biophysics Congress, Genova, Italy (lecture).
15. **Leng, F.**, Samul, R., Chen, B., and Xiao, Y. (2009) Molecular Mechanisms of Transcription-Driven DNA Supercoiling. Mechanisms and Regulation of Prokaryotic Transcription. Saxtons River, Vermont (poster).

16. **Leng, F.** and **Chen, L.** (2009) Protein-induced DNA unwinding is an intrinsic feature of certain sequence-specific DNA-binding proteins. The 53rd Annual Meeting of Biophysical Society. Boston, MA (poster).
17. **Leng, F.** (2008) Mechanisms of transcription-coupled DNA supercoiling: a biochemical perspective. FAME 2008, Kissimmee, Florida (invited lecture).
18. **Leng, F.** Cui, T. Morillo, V., and Joynt, S. (2008) Molecular Recognition of AT-rich DNAs by HMGA2. The Joint Biophysical Society 52nd Annual Meeting and 16th IUPAB International Biophysical Congress. Long Beach, CA (poster).
19. **Leng, F.** and Xiao, Y. (2006) TRANSCRIPTION-COUPLED DNA SUPERCOILING IN DEFINED PROTEIN SYSTEMS *IN VITRO*. *Molecular Genetics of Bacteria & Phages*. Cold Spring Harbor, New York (poster).
20. **Samul, R.** and **Leng, F.** (2006) A NOVEL SYSTEM FOR STUDY OF TRANSCRIPTION-COUPLED DNA SUPERCOILING *IN VIVO*. *Molecular Genetics of Bacteria & Phages*. Cold Spring Harbor, New York (poster).
21. **Rodriguez, L.**, Cui, T., and **Leng, F.** (2006) A new method to purify the Mammalian High Mobility Group Protein HMGA2, ACS meeting, Atlanta, GA (poster).
22. **Leng, F.** (2006, co-chair of Platform I: Protein Structure) The mammalian high mobility group protein A2, an intrinsically unstructured protein, is a homodimer, The 50th Annual Meeting of Biophysical Society, Salt Lake City, UT (lecture).
23. **Leng, F.** (2005) Molecular recognition of AT DNAs by the mammalian high mobility group protein HMGA2, Pacificchem 2005 (lecture).
24. **Leng, F.** & McMacken, R. (2005) Mechanisms of Transcription-Coupled DNA Supercoiling in Defined Protein Systems. *2005 Keystone Symposia on Molecular Mechanisms of DNA Replication and Recombination*. Keystone, Colorado (poster).
25. **Leng, F.** (2005) Energetics of mammalian high mobility group protein HMGA2 recognizing DNA minor groove. The 49th Annual Meeting of Biophysical Society, Long Beach, California (poster).
26. **Cui, T.**, Wei, S., Brew, K., and **Leng, F.** (2004) Specific Binding of High Group Protein HMGA2 to Minor Groove of DNA: Calorimetric and UV Melting Studies. *The 48th Annual Meeting of Biophysical Society*. Baltimore, MD (poster).
27. **Baez, M.** and **Leng, F.** (2004) Conformation of the Mammalian High Group Protein HMA2: A Fluorescence Study. *The 48th Annual Meeting of Biophysical Society*. Baltimore, MD (poster).

28. **Leng, F.**, Amado, L. & McMacken, R. (2003) Mechanisms of Transcription-Coupled DNA Supercoiling. *Molecular Genetics of Bacteria & Phages*, Madison, Wisconsin (lecture).
29. **Leng, F.** (2003) Molecular recognition of DNA minor groove by mammalian high mobility groove protein HMGA2. FAME 2003 (lecture).
30. **Amado, L., Leng, F., & Bigger, C.** (2002) Design and Construction of a Set of Plasmid DNA Templates for Studying Transcription-coupled DNA Supercoiling. *Annual Biomedical Research Conference for Minority Students (ABRCMS)*, New Orleans, LA (lecture).
31. **Leng, F.** (2002) Mechanistic Studies of Transcriptional Activation of DNA Replication. *Molecular Genetics of Bacteria & Phages*. Cold Spring Harbor, New York (poster).
32. **Leng, F.** & McMacken, R. (2002) Stimulation of Transcription-Mediated DNA Supercoiling by Sequence-Specific DNA-Binding proteins. *2002 Keystone Symposia on Molecular Mechanisms of DNA Replication and Recombination*. Snowbird, Utah (poster).
33. **Leng, F.** & McMacken, R. (2001) Sequence Specific DNA Binding Proteins Stimulate Transcription-Induced Negative Supercoiling of DNA Template. *45th Annual Meeting of Biophysical Society*. Boston, MA (lecture).

Invited Lectures/Seminars (2003-present)

1. **Leng, F.** (2015) DNA Topological Barriers: Discovery and Biological Functions. Nanjing University, Nanjing, China.
2. **Leng, F.** (2015) Molecular Interaction of the Mammalian High Mobility Group Protein AT-hook 2 with AT-rich DNA Sequences: from Biochemistry to Drug Discovery, Nanchang University, Nanchang, China.
3. **Leng, F.** (2012) DNA Topological Barriers: Concept and the Role in Transcription-Coupled DNA Supercoiling and 1 DNA Replication Initiation, University of Maryland College Park.
4. **Leng, F.** (2012) DNA Topological Barriers and Their Role in Transcription-Coupled DNA Supercoiling. Lunbda Lunch Seminar Program, National Cancer Institute.
5. **Leng, F.** (2012) DNA Topological Barriers: Concept and Functions. GRCBL, National Cancer Institute, Frederick.

6. **Leng, F.** (2012) DNA Topological Barriers: the Concept and Biological Functions. National Chiao Tung University, Taiwan.
7. **Leng, F.** (2011) Molecular Interaction of the Mammalian High Mobility Group Protein AT-hook 2 with AT-rich DNA Sequences: Can We Apply It to Drug Design? Clemson University.
8. **Leng, F.** (2011) The DNA Topological Barrier and effects on Transcription-coupled DNA supercoiling, National Cancer Institute.
9. **Leng, F.** (2010) Transcription-coupled DNA Supercoiling: in vitro and in vivo studies. INSTITUTE OF MICROBIOLOGY CHINESE ACADEMY OF SCIENCES.
10. **Leng, F.** (2009) MOLECULAR MECHANISM OF TRANSCRIPTION-COUPLED DNA SUPERCOILING. THE UNIVERSITY OF HONG KONG, HONG KONG, CHINA.
11. **Leng, F.** (2008) Mechanisms of Transcription-Driven DNA Supercoiling: What Have We learned So Far? University of Miami, FL.
12. **Leng, F.** (2007) Molecular Recognition of Specific AT-rich DNA Sequences by the Mammalian High Mobility Group Protein AT-hook 2. Florida State University, Tallahassee, FL.
13. **Leng, F.** (2006) "Frontiers in Nucleic Acids Chemistry" Symposium, to be held in Augusta, GA, Nov. 1 & 2 at the 2006 SERMACS meeting.
14. **Leng, F.** (2005) Transcription-Coupled DNA Supercoiling: Roles of Sequence-Specific DNA Binding Proteins, Florida Atlantic University, Boca Raton, FL.
15. **Leng, F.** (2004) From the mammalian high mobility group protein to transcription-coupled DNA supercoiling, the University of Mississippi Medical Center, Jackson, Mississippi.
16. **Leng, F.** (2004) Energetics of Mammalian High Mobility Group Protein HMGA2 Recognizing DNA Minor Groove, Jackson State University, Jackson, Mississippi.
17. **Leng, F.** (2005) Molecular recognition of minor groove by mammalian high mobility groove protein HMGA2, BIOMEDICAL AND COMPARATIVE IMMUNOLOGY SYMPOSIUM, FIU.
18. **Leng, F.,** Cui, T., & Baez, M. (2004) Molecular recognition of DNA minor groove by mammalian high mobility groove protein HMGA2. *American Chemical Society, Florida Annular Meeting and Exposition*, Orlando, FL.
19. **Leng, F.** (2004) Mechanisms of Transcription-Coupled DNA Supercoiling in vitro, Nanjing University, Nanjing, China.

20. **Leng, F.** (2003) RNA Polymerases Traveling along the DNA Double Helix: What Happens to the Track? Department of Biology, Florida International University.

8. CREATIVE WORK

N/A

9. WORKS IN PROGRESS

Papers submitted to journals for consideration (list Journal and date of submission; *corresponding author; underlined are students that I supervised at FIU)

1. Gu, M, Berrido, A., Gonzales, W. G., Miksovskaja, J., Chambers, J., and Leng, F. Fluorescently labeled circular DNA molecules for DNA topology and topoisomerases Submitted to *Nucleic Acids Research* on May 26, 2016.

Research in progress

1. Berrido, A., Chen, A., He, J., Tse-Dhin, Y., and **Leng, F.*** (2016) Biochemical and biophysical properties of positively supercoiled DNA. In preparation.
2. Zhi, X., Dages, S., Dages, K., Makemson, J., and **Leng, F.*** (2016) Activating supercoiling-sensitive promoters by transcription-coupled DNA supercoiling in *Escherichia coli*. In preparation.
3. Dages, K., De Cabrera, M., Zhi, X., and **Leng, F.*** (2016) Targeting transcription-coupled DNA supercoiling for discovering anti-gyrase antibiotics. In preparation.

Grant proposals under review

1. James and Esther King Biomedical Research Program 02/01/16-01/31/19
Nuclear-Mitochondria Crosstalk Enhances the Metastatic Potential of Lung Cancer
Role: co-PI (PI: Jeremy Chambers)
Amount: \$1,301,840.85
2. NIH R21 07/01/2016-06/30/2018
Targeting transcription-coupled DNA supercoiling for discovering antibiotics against bacterial DNA gyrase
Role: PI (co-PI, Dev Arya, Clemson University)
Amount: \$275,000

10. Funded Research

External Funding (total amount \$2,527,050)

1. 1R15GM109254-01A1 09/01/14-08/31/17

NIGMS

Transcription-Coupled DNA Supercoiling

The research project is to understand the molecular mechanisms and biological functions of TCDS and DNA topological barriers.

Role: PI (sole PI)

Amount: \$317,194

2. 2014.5-CAD-0014 02/01/15-07/31/16
Florida Translational Research Program (FTRP) at Sanford-Burnham
Screening anticancer compounds targeting HMGA2-DNA interactions
This proposal is to identify effective small molecule inhibitors for the treatment of cancers targeting HMGA2-DNA interactions.
Role: PI
The research will be carried out at Sanford-Burnham Medical Institute. No money will be transferred to FIU.
3. 1SC1HD063059-01A1 05/01/09-04/30/14
NIGMS
Mechanisms of Transcription-Coupled DNA Supercoiling.
This grant application is a renewal of the NIGMS grant S06GM008205.
Role: PI (sole PI)
Amount: \$972,442
4. Bridge grant 08BB-11 07/01/08 – 09/30/09
Bankhead-Coley Cancer Research Program
Dept of Health, State of Florida
Image Guided Intervention for Breast Cancer: Combined Hyperthermia and Chemotherapy with Reduced Cardiotoxicity
The major goals of this project are to design, synthesize, and test doxorubicin-peptide-conjugates against cancer cells.
Role: Co-PI (PI, Anthony McGoron)
Amount: \$76,210
5. S06 GM008205 04/01/04-03/31/09
NIGMS
Mechanisms of transcription-coupled DNA supercoiling.
This study investigates the mechanisms of transcription-coupled DNA supercoiling *in vitro* and in *E. coli* cells. The *in vitro* study focuses on decipher the role of certain sequence-specific DNA binding proteins, such as lactose repressor (LacI) on transcription-coupled DNA supercoiling.
Role: PI (sole PI)
Amount: \$936,604
6. DoD Instrumentation and Research Support Program for Hispanic-Serving Institutions (HSIs) 11/2005-5/2007

DoD

Acquisition of a Differential Scanning Microcalorimeter and a Titration Microcalorimeter.

This grant allows the Department of Chemistry and Biochemistry to buy two calorimeters: one differential scanning calorimeter (VP-DSC) and one isothermal titration calorimeter (ITC) from MicroCal, Inc.

Role: Co-PI (PI: Ramon Lopez dela Vega)

Amount: \$175,300

7. The Q'BIC Plan, Ophelia Weeks (PI) 6/2004-5/2005
NIGMS
Quantifying Biology in the Classroom.
This grant allows the FIU to improve our student's quantitative skills in the Department of Biology.
Role: Co-PI (PI: Ophelia Weeks)
Amount: \$49,300
8. **Mentor** of the MBRS Research Initiative for Scientific Enhancement (RISE) Program, NIGMS, (P.I., Charles Bigger).
9. **Mentor** of The Minority Access to Research Careers (MARC) Program, NIGMS (P.I., Ophelia Weeks).

Internal Funding

1. Bridge Funding, 10/21/2013-10/21/2014
FIU Division of Research Project ID: 800003710
Role: PI
Amount: \$66,537.20
2. "Molecular recognition of Mammalian High Mobility Group Protein HMGA2," *NIGMS FACULTY RESEARCH ENHANCEMENT AWARD*, \$2500 (direct cost), 2005, Pricipal Investigator.
3. FIU, college of Arts and Sciences, summer, 2003, \$4,000.
4. "Effects of transcription on DNA topology," *NIGMS FACULTY RESEARCH ENHANCEMENT AWARD*, \$5,000 (direct cost), 2003, Pricipal Investigator.
5. "The non-covalent interaction of high mobility group protein HMGI-C with DNA," summer 2002 provost's office and FIU foundation mini-research grant, \$5,000, summer 2002.

6. "The noncovalent Interactions between the Mammalian High Mobility Group Protein HMGA2 and DNA", *NIGMS FACULTY RESEARCH ENHANCEMENT AWARD*, \$5,000 (direct cost), 2002, Pricipal Investigator.

11. PROPOSALS SUBMITTED BUT NOT FUNDED

1. 1R01GM115635-01 07/01/2015-06/30/2019
NIGMS
DNA Topological Barrier
The proposed research on this essential biological phenomenon and long- standing mystery is to study molecular mechanisms of topological barriers in DNA molecules and further examine how the topological barriers divide the bacterial genome into different functional domains and regulate transcription.
Role: PI
Amount: \$1,437,001.90
2. James and Esther King Biomedical Research Program 02/01/15-01/31/18
Nuclear-Mitochondria Crosstalk Enhances the Metastatic Potential of Lung Cancer
Role: co-PI (PI: Jeremy Chambers)
Amount: \$1,301,840.85
3. Bill and Melinda Gates Foundation 7/1/2015-1/31/2017
Title: Formulating amoxicillin into Fruit Jelly for child patients.
Role: PI.
Amount: \$100,000
4. DoD Prostate Cancer Program 9/1/2014-8/31/2015
Title: Target epithelial mesenchymal transition for prostate cancer: the synergetic roles of HMGA2 and AR in cancer development and metastasis
Role: PI (co-PIs: Jeremy Chambers and Myles C. Hodgson)
Amount: \$100,000
5. NSF 13-510 8/1/2014-7/31/2017
Title: Molecular Mechanisms of DNA Topological Barriers
Role: PI (co-PI, David Dunlap at Emory University)
Amount: \$651,292
6. NIH 7/1/2014-6/30/2016
Title: Development of bacterial Topo I inhibitors
Role: co-PI (PI: Dev Arya at Clemson University)
Amount: \$270,000
7. NIH 1R01GM108611-01 12/1/2013-11/30/2017
Molecular Mechanisms of DNA Topological Barriers

Role: PI (co-PIs: David Dunlap at Emory University and Wilma Olson at Rutgers University)

Amount: \$1,445,297.79

8. NIH 1R01GM104081-01 12/1/2012-11/30/2016
Title: DNA Topological Barriers
Role: PI
Amount: \$1,433,134.59
9. NIH 1R01CA127315-01 4/1/2007-11/1/2010
Title: Structure/function of High Mobility Group Protein A2 Relevant to Cancer & Obesity
Role: PI
Amount: \$1,208,155
10. NIH 1R15GM072542-01A1 4/1/2006-3/31/2009
Molecular Recognition of DNA by Mammalian HMGA2 Protein
Role: PI
Amount: \$210,750
11. Florida Department of Health Biomedical Research Program 07/31/04-07/30/07
Title: Molecular Recognition of DNA by Mammalian High Mobility Group Protein HMGA2”
Role: PI
Amount: \$437,627
12. NIGMS (R15 GM072542-01 12/01/2005-11/30/2008
Title: Molecular Recognition of DNA by Mammalian High Mobility Group Protein HMGA2
Role: PI
Amount: \$210,750
13. American Heart Association (Grant-in-aid) 07/01/2005-6/30/2007
Title: Design and synthesis of anthracycline-peptide-conjugates targeted to nuclear DNA with less cardiotoxicity
Role: PI
Amount: \$120,000
14. National Science Foundation 2005-2008
Title: Acquisition of a Hybrid High-Resolution (HR), Triple-Quadrupole (TQ), Mass Spectrometer
Role: co-PI
Amount: \$507,045
15. NIGMS (R01GM067699-01) 04/30/2004-04/30/2009
Title: “Effects of Transcription on DNA Topology”,
Role: PI

Amount: \$800,000 (direct cost)

16. National Science Foundation 08/2004-07/2007
Title: "Molecular Recognition of DNA by Mammalian High Mobility Group Protein HMGA2"
Role: PI
Amount: \$341,151
17. American Chemical Society the Petroleum Research Fund 2003-2005
Title: Thermodynamic and kinetic studies of non-covalent interactions between high mobility group protein HMGI-C and DNA
Role: PI
Amount: \$35,000
18. Research Corporation 2002-2004
Title: Design, synthesis, and characterization of a type of novel linear supercoiled DNA molecules
Role: PI
Amount: \$35,000
19. Charles E. Culpeper Biomedical Pilot Initiative 2002-2003
Molecular mechanism of non-covalent interactions between high mobility group protein HMGI-C and DNA
Role: PI
Amount: \$25,000

12. PATENT DISCLOSURES, APPLICATIONS, AND AWARDS

1. Title: SELECTIVE INHIBITION OF BACTERIAL TOPOISOMERASE I. Inventors: Nihar Ranjan (Clemson University), Dev P. Arya (Clemson University), and Fenfei Leng (Florida International University) [Web link](#)
2. Title: METHODS AND KITS FOR HIGH THROUGHPUT SCREENING FOR COMPOUNDS TARGETING DNA-BINDING AND RNA-BINDING PROTEINS. Inventors: Fenfei Leng (Florida International University), Nicole Alonso (Florida International University), and Jeremy Chambers (Florida International University) [Web link](#)
3. Title: LABELED CIRCULAR DNA MOLECULES FOR ANALYSIS OF DNA TOPOLOGY AND TOPOISOMERASES AND FOR DRUG SCREENING. Inventor: Fenfei Leng (Florida International University)

13. PROFESSIONAL HONORS, PRIZES, FELLOWSHIPS

- Robert A. Mahaffey, Jr. Memorial Award, 1997
- Semifinalist of Student Research Achievement Award of the 41st National Annual Meeting of Biophysical Society, 1997

- Member of the Honor Society of Phi Kappa Phi
- Member of the Sigma Xi Research Society

14. OFFICES HELD IN PROFESSIONAL SOCIETIES

N/A

15. OTHER PROFESSIONAL ACTIVITIES AND PUBLIC SERVICE

Scientific Societies

- The Biophysical Society
- American Chemical Society
- American Association for the Advancement of Sciences

Public service (Professional Activities)

- Editor, **PLOS ONE**.
- Editor, **Scientific Reports**
- Grant reviewer for **National Institutes of Health** and **National Science Foundation**.
- Reviewer for Nucleic Acids Research, Reviewer for Biopolymers, Biochem. Biophys. Acta, Journal of Inorganic Biochemistry, Gene, Journal of American Chemical Society, Biochemistry, Journal of Physical Chemistry, Planta Medica, Biochimie, Scientific Report, Photochemistry and Photobiology Journal, Biophysical Journal, PLOS ONE, Biotechnology Progress, Chemical Reviews, Analytical Biochemistry, Molecular BioSystems, International Journal of Molecular Sciences, Clinical Microbiology and Infection, Biophysical Chemistry, Chemical Communications, European Biophysics Journal, Molecular Pharmaceutics, ACS books, Science China Life Sciences, and Taylor & Francis Group LLC Book “Physical Principles in Nucleic Acid Chemistry,” by David Draper.
- Research advisor for American Heritage School Plantation.

Service to the University

To the University

- Faculty senator, 2013-2014
- Faculty senator alternate, 2014-2015
- Faculty senator, 2015-2017
- Radiation Control Committee, 2008-2011
- Chair Biochemistry section of ARCH 2014, FIU
- Reviewer and Chair Chemistry & Biochemistry section, FIU-URC Conference, 2015

To the College of Arts and Sciences

- Biomedical and Behavioral Sciences Committee (Integrated Life Sciences Committee) to establish the School of Integrated Science and Humanity, 2008-2011
- Biomolecular Science Committee to establish Biomolecular Sciences Institute, 2011-2012

To the Department of Chemistry and Biochemistry

- Instrumental facilities committee, 2009, 2013, 2014
- Graduate student recruitment committee, 2013, 2014, 2015
- Radiation safety officer, 2008, 2009, 2010, 2013, 2014
- Budget committee, 2007, 2008, 2009 (chair), 2012
- Tech representative, 2012
- FAR revision committee, 2013
- Biochemistry PhD program executive committee, 2009
- Public Relation Committee, 2008
- Graduate committee for Forensic Sciences, 2007, 2008
- Faculty search committee, 2010 (Biochemistry), 2011 (Analytical)

16. Other supporting information

A. Courses taught at FIU

| Semester | Year | Course | Description | Credits |
|----------|------|----------|-------------------------------------|---------|
| Fall | 2001 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2002 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2002 | CHM5503 | Physical Chemistry of Nucleic Acids | 3 |
| Fall | 2002 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2003 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2003 | CHM6382 | Advance Biochemistry | 3 |
| Fall | 2003 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2004 | CHM4304 | Biochemistry I | 3 |
| Spring | 2004 | CHM4304L | Biochemistry Lab | 1 |
| Fall | 2004 | CHM4304 | Biochemistry I | 3 |
| Spring | 2005 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2005 | CHM6930 | Chemistry seminar | 1 |
| Fall | 2005 | CHM4304L | Biochemistry Lab | 1 |
| Fall | 2005 | CHM6930 | Chemistry seminar | 1 |
| Fall | 2005 | CHM4304 | Biochemistry I | 3 |
| Spring | 2006 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2006 | CHM4307 | Biochemistry II | 3 |
| Fall | 2006 | CHM4304L | Biochemistry Lab | 1 |
| Fall | 2006 | CHM5503 | Physical Chemistry of Nucleic Acids | 3 |
| Fall | 2006 | CHM4304 | Biochemistry I | 3 |
| Spring | 2007 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2007 | CHM6382 | Advance Biochemistry | 3 |
| Fall | 2007 | CHM4304L | Biochemistry Lab | 1 |
| Fall | 2007 | CHM4304 | Biochemistry I | 3 |
| Fall | 2007 | CHM6936 | Chemistry Colloquium | 1 |
| Spring | 2008 | CHM4304L | Biochemistry Lab | 1 |
| Fall | 2008 | CHM4304L | Biochemistry Lab | 1 |

| | | | | |
|--------|------|----------|-------------------------------------|-----|
| Fall | 2008 | CHM4304 | Biochemistry I | 3 |
| Fall | 2008 | CHM5503 | Physical Chemistry of Nucleic Acids | 3 |
| Spring | 2009 | CHM4304L | Biochemistry Lab | 1 |
| Fall | 2009 | CHM4304L | Biochemistry Lab | 1 |
| Fall | 2009 | | Course Buy-out (18% of my salary) | 3 |
| Spring | 2010 | CHM4304L | Biochemistry Lab | 1 |
| Spring | 2010 | CHM4304 | Biochemistry I | 3 |
| Spring | 2010 | BCH6108 | Biochemical Techniques | 3 |
| Fall | 2010 | CHM5503 | Physical Chemistry of Nucleic Acids | 3 |
| Fall | 2010 | | Course Buy-out (18% of my salary) | 3 |
| Spring | 2011 | CHM4304 | Biochemistry I | 3 |
| Fall | 2011 | | Sabbatical at NIH | |
| Spring | 2012 | BCH6108 | Biochemical Techniques | 3 |
| Spring | 2012 | | Course Buy-out (18% of my salary) | 3 |
| Fall | 2012 | | Course Buy-out (27% of my salary) | 4.5 |
| Spring | 2013 | CHM4304 | Biochemistry I | 3 |
| Fall | 2013 | BCH6108 | Biochemical Techniques | 3 |
| Spring | 2014 | CHM4304 | Biochemistry I | 3 |
| Spring | 2014 | CHM5506 | Physical Biochemistry | 3 |
| Fall | 2014 | BCH6108 | Biochemical Techniques | 3 |
| Fall | 2014 | CHM4304 | Biochemistry I | 3 |
| Spring | 2015 | BCH6037 | Advanced Biochemistry II | 3 |
| Spring | 2015 | CHM4930 | Senior seminar | 1 |

B. Graduate Student Supervision

B.1. Thesis/Dissertation Advisor (5 Masters and 2 PhD completed)

1. Linda M. Erdei 2001-2002 M.S. "Use of whole genome amplification to improve performance of the AmpliType PM and QDA1 amplification and typing kit for forensic samples with low copy number of DNA templates." October 2002. Current position: Laboratory director, Lake County Crime Lab, Ohio
2. Angelica Mendoza 2002-2004 M.S. "Conformational Analysis of the Mammalian High Mobility Group Protein HMGA2", November 2004. Current position: Forensic Scientist, Ventura County Sheriff's Office, Ventura, CA
3. Lorraine Edwards 2003-2006 M.S. "Biochemical and biophysical characterization of high mobility group protein A2," March, 2006. Current position: manager of reference laboratory for exotic animal viruses, London, UK
4. Rebecca Samul, 2004-2007 M.S. "Transcription-Induced Hypernegative Supercoiling of Plasmid DNA By T7 RNA Polymerase in *E. coli* Topoisomerase Deficient Strains," April, 2007. Current position: Director, Quest Diagnostics Nichols Institute, Chantilly, VA

5. Tengjiao Cui, 2001-2007 Ph.D. “Specific Binding of the Mammalian High Mobility Group Protein AT-hook 2 to the Minor Groove of AT-rich DNAs: Thermodynamic and Specificity Studies,” May, 2007. Current position: Assistant Professor of Pathology, University of Miami Medical School, Miami, FL
6. Xiaozhou Xu, 2007-2010 M.S., Kinetics of *E. coli* Topoisomerase I and Energetic Studies of DNA Supercoiling of Isothermal Titration Calorimetry, October, 2010. Current position: Chemist II at Sigma-Aldrich, Louisville, Kentucky
7. Xiaoduo Zhi, 2007-2013 Ph.D., Transcription-coupled DNA supercoiling in *Escherichia coli*: mechanisms and biological functions, May, 2013. Current position: Scientist, Advanced Fertility Center of Chicago, Chicago, IL

B2. Thesis/Dissertation Committee Member

Vanessa Thompson, CHM, PHD
 Adriana Galvis, Biology, PhD
 Erika Doctor, CHM, PhD
 Mark Clifton, Biology, PhD
 Alicia Fernandez-Fernandez, Biomedical Engineering, PhD
 Juan Jeanniton, CHM, PhD
 Hui Tian, CHM, PhD
 Yuxiang Mao, CHM, PhD
 Li Liu, CHM, PhD
 Dragan Simovic, CHM, PhD
 Julie Lynn Langdon, CHM, MS
 Robert Perez Jr., CHM, PhD
 Jamie Winshell, CHM, MS
 Richard Snyder, CHM, PhD
 Mingping Di, CHM, PhD
 Charles L. Parkins, CHM, MS
 Minakshi C. Gurbhele, CHM, MS
 Danny S. Gonzalez, Biomedical Engineering, MS
 Megan Bottegal, CHM, PhD
 Zhonghua Wang, CHM, PhD
 Iru Paudel, Medicine, PhD
 Georgiana Gibson-Daw, CHM, PhD
 Shayna Sandhaus, Biochemistry, PhD
 Seongshin Gwak, CHM, PhD
 Alyssa Garabedian, CHM, PhD
 Christopher L. De Jesus, CHM, MS
 Meghan Roig, CHM, MS
 Pamela Garcia, Biochemistry, PhD
 Juan Arevalo, CHM, PhD
 Vanesa Mendez, CHM, PhD

B3. Other Supervision

Undergraduate students

Pablo Penaloza, 2001-2002
Luciana Amado, 2001-2003
Hilda Ramon, 2003-2004
Luisel Rodriguez, 2004-2006
Suzanne Joynt, 2006-2009
Victor Morrilo, 2006-2008
Jasmine Young, 2009-2010
Tiffany Chin-You, 2009-2010
Rebeca Armenteros, 2010-2011
Robert Wright, 2012
Nicole Alonso 2013-2015
Andrea Berrido 2012-2015
Andrew Chen 2013
Kelley Dages 2013-2015
Samantha Dages 2013-present (Samantha Dages is a graduate student in the lab)
Catherine Perez 2013-2015
Ashley Tschiggfrie 2013-2015
Roboan Guillen 2013-2015
Maria de Cabrera 2014-present (Maria now is a graduate student in the dept.)
Juan Medina 2015-present
Gabriela Ortega 2015-present
Daniel Moy 2015-present

High school students

Maxwell Gu (2015)

C. Other Personnel Supervision

Post-doctor Associates

Weijuan Zheng (2003-2004), Current position: Associate Professor of Biochemistry, Nanjing University, Nanjing, China

Shengji Mao (2004-2005), Current position: unknown

Yazhong Xiao (2005-2007), Current position: Professor of Biology, Anhui University, Hefei, China

Bo Chen (2007-2012), Current position: Associate Professor of Biochemistry, the Institute of Blood Transfusion (IBT), Chinese Academy of Medical Sciences, China

Geraldine Fulcrand (2009-2013), current position: lecturer, University of Montpellier, France

D. Course, Curriculum Development Activities (since tenure)

The Department of Chemistry & Biochemistry with the Department of Biology and School of Medicine now is offering a PhD program of Biochemistry. In support to this effort, several new graduate courses have been developed. “Biochemical Techniques” (BCH6108) is designed to teach theories and practice of basic biochemical techniques commonly used in a biochemistry laboratory. It will include six parts: part 1, basic biochemical techniques such as how to make a buffer and gel electrophoresis; part 2, protein purification; part 3. spectroscopy including UV-Vis, CD, fluorescence, and NMR spectroscopy as well as mass spectrometry; part 4, Molecular cloning and polymerase chain reaction (PCR); part 5, DNA sequencing and blotting techniques; part 6: calorimetry and high through-put drug screening. Dr. Watson Lees and I designed and developed the curriculum for this class, and taught this class several times since 2010.

“Advanced Biochemistry II” (BCH6037) is the second part of a two-semester graduate biochemistry curriculum. This course will discuss in depth the major cellular processes and functions at the molecular level. These processes and function include genome, DNA topology, DNA topoisomerases, chromatin structure, DNA replication and repair, DNA recombination, DNA methylation and demethylation, DNA damages and free radicals, RNA interference, transcription, protein adducts, and cell signaling. The course will guide students towards a comprehensive understanding of the molecular mechanisms and biochemistry of processes and function that participate in cell division and proliferation, cellular DNA damage response, regulation of gene expression, integration of cellular function through signal transduction in form of lectures and literature readings. At the end of the semester, students are expected to obtain enough knowledge about modern biochemistry, i.e. molecular biology that they may apply for their future research. I was part of the team of faculties that developed the curriculum and have taught this class in the spring semester of 2015.