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James Graham Brown Cancer Center
Department of Medicine
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EDUCATION

- 10/1993–07/1996 B.Sc. in Chemistry (Class I with Honors, equivalent to *summa cum laude*)
University of Kent at Canterbury, England
- Final year research thesis (with *viva voce* examination): Diffusion Analysis of Three Commercially Important *o*-Hydroxybenzaloxime Extractant Ligands and their Copper Complexes in the Industrially Important Organic Solvent Orfom SX7: Application of a Modified Taylor-Aris Dispersion Technique
- Final year literature thesis (with oral presentation): Methods, Results and Data from Attempts to Determine Partition Coefficients for Cellular Systems
- 07/1997 Applied Biochemistry and Biotechnology Intensive Short Course
University of Aarhus, Denmark
- 10/1996–11/2000 Ph.D. in Chemistry: “Dendrimer Characterisation and Inclusion Chemistry with Organic Substrates and Polynucleotides” (Thesis Advisor: Professor J.C. Mitchell; Co-Advisors: Professors A.E. Beezer and J.A. Connor)
University of Kent at Canterbury, England
- EPSRC Industrial CASE Ph.D. Studentship Award (Sponsored by the Engineering and Physical Sciences Research Council (EPSRC) and SmithKline Beecham Pharmaceuticals)
- Collaborations: SmithKline Beecham Pharmaceuticals; Cancer Research Campaign, Sutton, Surrey, England; Yorkshire Cancer Research Laboratory of Drug Design, School of Biomedical Studies, University of Bradford, England
- 09/2000–09/2001 Postdoctoral Fellow (Mentor: Dr. Jonathan B. Chaires)
Department of Biochemistry, University of Mississippi Medical Center, Jackson, MS
- Research focus: Funding from a national cancer grant in the area of anti-cancer drug design. Employed biophysical techniques including isothermal titration calorimetry, differential scanning calorimetry, temperature controlled UV/Vis spectrophotometry, fluorescence spectrometry, circular dichroism, and a novel competition dialysis technique to characterize ligand-DNA interactions. Specific studies included the biophysical characterization of the anticancer drug ellipticine with nucleic acids.

- 09/2001–05/2003 Postdoctoral Fellow (Mentor: Dr. David E. Graves)
Chemistry Department, University of Mississippi, Oxford, MS
- Research focus: NSF-funded research to characterize the biophysical properties of ligand-DNA interactions through calorimetry, optical spectroscopy and NMR studies. Specific studies included the DNA binding energetics of the sequence selective ligand actinomycin D, and the influence of substituent modification in the interaction of the classical DNA intercalator ethidium bromide with DNA. Involved in mentoring of two graduate and two undergraduate students.
- 05/2003–07/2004 Postdoctoral Fellow (Mentor: Dr. David E. Graves)
Chemistry Department, University of Alabama at Birmingham, Birmingham, AL
- Research focus: Continuation of studies started in the Graves' research group at the University of Mississippi. New research focus included the thermodynamic characterization of the interaction of the enzyme inhibitors swainsonine and LS6 with the golgi α -mannosidase enzyme from *Drosophila melanogaster* using Isothermal Titration Calorimetry. Application of osmometry to the characterization of the interaction of actinomycin D with oligonucleotides. Mentoring of four undergraduate students.
- 07/2004–07/2007 Postdoctoral Research Fellow (Mentor: Dr. Jonathan B. Chaires)
James Graham Brown Cancer Center, University of Louisville, Louisville, KY
- Research focus: Examination of the biophysical properties of ligand-DNA interactions as applied to anti-cancer research through the application of a variety of calorimetric and spectroscopic techniques. Development of high-throughput differential scanning calorimetry and competition dialysis methods to rapidly screen for ligand binding. Managed activities of the biophysical core facility in the Brown Cancer Center. Mentoring of graduate students.

ACADEMIC APPOINTMENTS

- 06/1995–09/1995 Research Assistant
University of Kent at Canterbury, England - Contract laboratory project for Zeneca Agrochemicals
- Project Title: A Taylor-Aris Diffusion Study of Small Organic Molecules (application to the development of commercial copper extractant ligands)
- 06/1996–09/1996 Research Assistant
University of Kent at Canterbury, England - Contract laboratory project for Vanguard Medica
- Project Title: Synthesis and Chiral Reduction of an Industrially Important Indole (application to the synthesis of an anti-migraine drug)
- 07/2007–Present Assistant Director, Biophysical Core Facility
James Graham Brown Cancer Center
University of Louisville, Louisville, KY

09/2011–09/2014	Instructor of Medicine Department of Medicine University of Louisville, Louisville, KY
09/2011–Present	Associate Scientist James Graham Brown Cancer Center University of Louisville, Louisville, KY
09/2014–Present	Assistant Professor of Medicine (Tenure-track) Department of Medicine, Division of Hematology and Oncology University of Louisville, Louisville, KY
12/2014–Present	Assistant Professor (Associate Appointment) Department of Biochemistry and Molecular Genetics University of Louisville, Louisville, KY
10/2016–Present	Member of the Graduate Research Training Faculty School of Medicine University of Louisville, Louisville, KY

OTHER POSITIONS AND EMPLOYMENT

02/2011–08/2015	Co-founder and Consultant, Louisville Bioscience, Inc., Louisville, KY Startup biotechnology company developing the plasma thermogram technology of which I am a co-inventor with other faculty in the James Graham Brown Cancer Center. The technology utilizes differential scanning calorimetry to obtain blood plasma denaturation profiles for clinical diagnostics
01/2013–Present	Consultant, TA Instruments, New Castle, DE Advise on microcalorimetry instrumentation applications.

CERTIFICATION AND LICENSURE

Not Applicable

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

1995–2001	Member , Society of Chemical Industry
1995–1996	Member , Royal Society of Chemistry
1996–2001	Graduate Member , Royal Society of Chemistry
2003–2011	Member , Biophysical Society
2004–2011	Member , Association of Biomolecular Resource Facilities
11/2004	Judge , Research! Louisville 2004, University of Louisville
11/2005	Judge , Research! Louisville 2005, University of Louisville

2010–2011	Member , American Society of Clinical Oncology
09/2012	Judge , Research! Louisville 2012, University of Louisville
10/2012	Judge , James Graham Brown Cancer Center Retreat, University of Louisville
10/2013	Judge , Research! Louisville 2013, University of Louisville
07/2014	Judge , 2014 NCI Cancer Education Program, University of Louisville
09/2014	Judge , Research! Louisville 2014, University of Louisville
10/2014	Judge , James Graham Brown Cancer Center Retreat, University of Louisville
10/2015	Judge , Research! Louisville 2015, University of Louisville
08/2016	Judge , 2016 NCI Cancer Education Program, University of Louisville
10/2016	Judge , Research! Louisville 2016, University of Louisville
10/2016	Awards Committee , James Graham Brown Cancer Center Summer Intern Program, University of Louisville
08/2017	Judge , 2017 NCI Cancer Education Program, University of Louisville
09/2017	Judge , Research! Louisville 2017, University of Louisville
08/2018	Judge , 2018 NCI Cancer Education Program, University of Louisville
09/2018	Judge , Research! Louisville 2018, University of Louisville

HONORS AND AWARDS

1996	Rotary prize for distinguished performance in the final year undergraduate (Part II) examinations, University of Kent at Canterbury, England
1996	Prize for best performance in Medicinal Chemistry, University of Kent at Canterbury, England
1996–2000	EPSRC Industrial CASE Ph.D. Studentship Award, University of Kent at Canterbury, England (Sponsored by the Engineering and Physical Sciences Research Council (EPSRC) and SmithKline Beecham Pharmaceuticals)
2002	Award for best poster in the chemistry category, University of Mississippi Chapter of Sigma Xi and University of Mississippi Office of Research Poster Symposium, University of Mississippi, MS (Apr 4, 2002)
2008	License honoree, Celebration of Faculty Excellence, University of Louisville
2009	License honoree, Celebration of Faculty Excellence, University of Louisville
2010	Travel award for the American Society of Clinical Oncology (ASCO) - National Cancer Institute (NCI) – European Organisation for Research and Treatment of Cancer (EORTC) Diagnostic Development Tutorial
2014	News story, <i>The end of Pap Smears, possibly</i> . FOX 13 Tampa Bay, Health News and Updates from Dr. Joette Giovinco, Jan 8, 2014
2014	News story, <i>Plasma thermogram can serve as an indicator of cervical cancer</i> . News Medical, online, Jan 8, 2014
2014	News story, <i>Cervical Cancer Screening To Improve With ‘Heat Test’: Thermography Spots Signs of Tumor Growth</i> . Medical Daily, online, Jan 8, 2014
2014	News story, <i>Simple Test Can Indicate Cervical Cancer</i> . Science Newsline, online, Jan 8, 2014
2014	News story, <i>Cervical cancer breakthrough as scientists discover a test that heats the blood could diagnose the disease</i> . Daily Mail, online, Jan 8, 2014
2014	News story, <i>‘Heat maps’ find cervical cancer</i> . BBC News, online, Jan 9, 2014
2014	News story, <i>‘Heat Print’ Blood Tests Could Diagnose Cervical Cancer</i> . The Huffington Post UK, online, Jan 9, 2014
2014	News story, <i>Simple, Cheap Blood Test Detects Cervical Cancer Early</i> . International Business Times, online, Jan 9, 2014
2014	News story, <i>Cervical cancer can now be detected with the heat profile of your blood!</i> The Health Site, online, Jan 10, 2014

2014	News story, <i>"Plasma Thermogram" – New Ingenious Method to Detect Cervical Cancer</i> . Discovery Zone, online, Jan 12, 2014
2014	News story, <i>UofL study finds test can ID cervical cancer</i> . Courier-Journal newspaper, Louisville, KY, Jan 13, 2014
2014	News story, <i>Louisville Team and Spinout LBldx Exploring Protein Denaturation Profiles as Disease Markers</i> . ProteoMonitor Magazine, online, Jan 17, 2014
2014	News story, <i>Cervical Cancer: Is a New Detection Method Coming?</i> Psychiatric Times, online, Jan 17, 2014
2014	News story, <i>Use of Noninvasive Blood Thermograms to Diagnose Cervical Cancer</i> . Lab Medica, online, Jan 22, 2014
2014	News story, <i>Study: Plasma thermogram shows promise in detecting cervical cancer</i> . Smart Brief, online, Jan 22, 2014
2014	News story, <i>Study: Medical Marvels. Emerging Non-Invasive Technologies</i> . University of Louisville Magazine, Summer 2014
2014	License honoree, Celebration of Faculty Excellence, University of Louisville
2016	Single nominee from the University of Louisville for the Mallinckrodt Foundation grant program

COMMITTEES / DEPARTMENT SERVICE

07/2007–Present	Assistant Director, Biophysical Core Facility, James Graham Brown Cancer Center, University of Louisville
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Provide biophysical laboratory services, training and expertise in the design, execution and analysis of biophysical research experiments for investigators within the University of Louisville as well as external investigators and companies. Involvement varies depending on the needs of the study and includes generation of preliminary data, performing experiments for a funded study or for external companies, study design, training of new users for independent instrument use, data analysis and interpretation, development of new or modified assays and assistance with preparation of manuscripts for publication.

Investigator/Institution	Technique	Project
T.W-M. Fan & A. Lane, Chemistry & Brown Cancer Center, University of Louisville*	AUC	SECIS RNA structure
Drs. R.D. Gray & W.L. Dean, Biochemistry, University of Louisville*	AUC, ITC, DSC	Metalloproteinase-collagen interactions
Dr. Z.-H. Song, Pharmacology and Toxicology, University of Louisville*	Fluorescence	Structure and Function of Cannabinoid receptors
Dr. K. Kang and J. Lee, Chemical Engineering, University of Louisville*	ITC	Thermodynamics of ion-protein interactions
Dr. B. Wattenberg, Biochemistry, University of Louisville*	CD	Solution properties of intracellular targeting peptides
Dr. D. Crimmins, Washington University School of Medicine*	AUC	NT-proBNP, proBNP, and glycosylated proBNP

V. Johnson & Dr. T. Mueser, University of Toledo, Ohio*	AUC	Single stranded DNA binding protein from <i>A.Pernix</i>
Apoimmune Inc., Louisville*	Diode Array, AUC	E7 and conjugate with SA-4-BBL protein
Dr. R. Feldhoff, Biochemistry, University of Louisville*	CD	Protein and glycoprotein biochemistry; salamander pheromones
Dr. E. Lewis, Northern Arizona University*	CD, AUC	Drug-quadruplex interactions for regulation of oncogenes
Dr. D.P. Arya, Clemson University*	Fluorescence	Nucleic acid therapeutics and synthesis of small molecule carbohydrate mimetics
Dr. J. Arnez, Chemistry, University of Louisville*	Diode Array, CD, AUC	Stability and conformation of catalytic RNA
Drs. P.J. Bates & J.O. Trent, Brown Cancer Center, University of Louisville*	CD, AUC, Diode Array, ITC, DSC	Biophysics of nucleolin-GRO interactions; structure and stability of nucleolin and GRO aptamer
Dr. J.B. Chaires, Brown Cancer Center, University of Louisville*	CD, AUC, Diode Array, ITC, DSC, fluorescence, stopped-flow	Drug-DNA interactions; telomeric DNA structures and stability
Dr. A.N. Lane, Brown Cancer Center, University of Louisville*	AUC, ITC, DSC, CD, Diode Array, Fluorescence	Structure and thermodynamics of Mbp1-DNA interactions
Dr. A.B. Jenson, Brown Cancer Center, University of Louisville*	AUC, CD	Papillomavirus proteins
Dr. M.C. Maurer, Chemistry, University of Louisville*	ITC, AUC	Molecular recognition and mechanism in blood coagulation; thrombin-peptide interactions
Dr. H. Ye, Brown Cancer Center, University of Louisville*	ITC, AUC	SMC SUMO ligase proteins
Dr. J. Chesney, Brown Cancer Center, University of Louisville*	Diode Array, Fluorescence	Regulation of glucose metabolism in cancer cells, via the activity of iPKF-2; interaction of F2,6-BP with CDK1
Dr. D.M. Miller, Brown Cancer Center, University of Louisville*	AUC, CD	Development of novel anticancer oligonucleotides
Dr. D. Demuth, School of Dentistry, University of Louisville*	CD, ITC	Microbial evasion of host immune response; bacterial cell-to-cell communication; regulation

		of bacterial virulence gene expression; molecular mechanisms of microbial biofilm development
Dr. C. Ng, Radiology, Brown Cancer Center, University of Louisville*	Diode Array	Development, evaluation, and kinetic studies of radiopharmaceuticals; the use of molecular imaging for biomedical research
Dr. K.E. Palmer, Brown Cancer Center, University of Louisville*	DSC	Griffithsin serum proteomics
Dr. D. Dignam, University of Toledo, Ohio*	AUC, DSC	Development of modified human albumin for the treatment of shock; study of aminoacyl tRNA synthetases
Dr. M. Cho, Case Western University*	AUC	Biochemical and immunological properties of viral envelope glycoprotein for the development and evaluation of novel vaccine vectors, e.g. HIV vaccine
Dr. R. Wilton, Argonne National Laboratory*	DSC	Structural stability of engineered antibodies
Dr. W.J. Ball, University of Cincinnati**	DSC	Structural characterization of a humanized anti-cocaine monoclonal antibody
Dr. P. Ragazzon, University of Salford, England**	Fluorescence, CD, DSC	Interactions of novel quadruplex binders
Dr. E.G. Mueller, Chemistry, University of Louisville**	CD	Structural characterization of RNA enzymes
Dr. M.A. Menze, Biology, University of Louisville**	CD, AUC	Structure of intrinsically disordered proteins
Dr. R. Lamont, Dentistry, University of Louisville**	CD, ITC	Structure and interactions of oral pathogen proteins
Dr. L. McNally, Brown Cancer Center, University of Louisville/Wake Forest**	CD, AUC, ITC	Characterization of theranostic nanoparticles; characterization of imaging dyes
Dr. C.E. Schaner-Tooley, University at Buffalo**	CD, ITC	Interactions of N-terminally modified proteins
Dr. J. Christopher States, Pharmacology and Toxicology, University of Louisville**	DSF, DSC, CD, ITC	Structure, stability and binding interactions of zinc finger proteins

*Completed project

**Ongoing project

Graduate Program Committee Service:

2015	Candidate interviewer for Department of Biochemistry and Molecular Genetics graduate program committee, University of Louisville
2016	Candidate interviewer for Department of Biochemistry and Molecular Genetics graduate program committee, University of Louisville
2016	Candidate interviewer for Department of Medicine M.D./Ph.D. program committee, University of Louisville

Dissertation Committee Member:

05/2016 – 05/2017	Phillip Chuong, Senior honors thesis committee, Department of Biology, University of Louisville
09/2015 – 12/2017	Sarah Kendrick, Ph.D. dissertation committee, Department of Biostatistics, University of Louisville
09/2015 – 08/2018	Kaitlyn Shields, Ph.D. dissertation committee, Department of Biochemistry and Molecular Genetics, University of Louisville

Meeting Organizing Committees:

2016	Organizing Committee Member, 12 th World Cancer Conference, London, England
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Outreach:

09/2014	Career Options Panel, Saturday Night Thermo Session for trainees attending The 28 th Annual Gibbs Conference on Biothermodynamics
12/2015	Lab presentation and meet with students attending The Leukemia & Lymphoma Society “Meet a Researcher Day” at the James Graham Brown Cancer Center, University of Louisville
04/2016	Lab presentation and meet with students from The Idea Academy attending a researcher tour at the James Graham Brown Cancer Center, University of Louisville
02/2018	Lab presentation and meet with student from Assumption High School attending a shadowing day at the Clinical & Translational Research Building, James Graham Brown Cancer Center, University of Louisville

Other Service:

05/2016	Volunteer for James Graham Brown Cancer Center cancer survivor celebration day, University of Louisville
02/2016	Candidate interviewer for James Graham Brown Cancer Center administrative assistant position, University of Louisville
05/2017	Volunteer for James Graham Brown Cancer Center cancer survivor celebration day, University of Louisville
10/2017	Candidate interviewer for Office of Technology Transfer technology manager position, University of Louisville
03/2018–Present	James Graham Brown Cancer Center space utilization committee, University of Louisville
05/2018	Volunteer for James Graham Brown Cancer Center cancer survivor celebration day, University of Louisville
09/2018	Candidate interviewer for James Graham Brown Cancer Center administrative assistant position, University of Louisville

EDUCATIONAL ACTIVITIES*Course Lecturer / Instructor:*

1994–1995	School student teaching and tutoring scheme, Canterbury High School, Canterbury, Kent, England
1996–1997	Tutorial leader in mathematics for undergraduate natural sciences students, University of Kent at Canterbury, England
1996–1998	Physical chemistry laboratory instructor for undergraduate chemistry students, University of Kent at Canterbury, England
1997–1998	Chief laboratory instructor and co-ordinator for undergraduate chemistry students, University of Kent at Canterbury, England
1997–1998	Tutorial leader in IR/Raman, MS, NMR for undergraduate chemistry students, University of Kent at Canterbury, England
1997–1998	Private mathematics tuition to A-Level, England
07/2007	Workshop instructor for both academic and non-academic professionals: Characterizing the Physical Properties of Purified Antibodies, Biomolecular Interaction Technologies Center, University of New Hampshire, Durham, NH
Spring 2012	Course lecturer – Biochemistry 680: Techniques in Biomolecular Interaction (advanced, 2 credit hour graduate-level course), University of Louisville
Spring 2013	Course lecturer – Biochemistry 680: Techniques in Biomolecular Interaction (advanced, 2 credit hour graduate-level course), University of Louisville
Summer 2013	Guest organizer – Biophysical Seminar Series, University of Louisville James Graham Brown Cancer Center
Fall 2013	Course lecturer – Biochemistry 680: Biomolecular Interactions (advanced, 2 credit hour graduate-level course), University of Louisville
Fall 2014	Course lecturer – Biochemistry 680: Biomolecular Interactions (advanced, 2 credit hour graduate-level course), University of Louisville
Fall 2015	Course lecturer – Biochemistry 680: Biomolecular Interactions (advanced, 2 credit hour graduate-level course), University of Louisville
Fall 2016	Course lecturer – Biochemistry 680: Biomolecular Interactions (advanced, 2 credit hour graduate-level course), University of Louisville
Fall 2017	Course lecturer – Biochemistry 680: Biomolecular Interactions (advanced, 2 credit hour graduate-level course), University of Louisville
Fall 2018	Course lecturer – Biochemistry 680: Biomolecular Interactions (advanced, 2 credit hour graduate-level course), University of Louisville

Research Project Mentoring:

2005–2007	Chongkham Mekmaysy, M.Sc. student, Department of Biochemistry, University of Louisville
2006–2007	Elizabeth Romaine-Schmidt, M.Sc. student, Department of Chemistry, University of Louisville
Summer 2006	Fadi Azer, Summer research intern, University of Louisville
Summer 2007	Eric Bugland, Summer research intern, University of Louisville
Summer 2007	Wojciech Kapalczynski, Summer pre-med research student, University of Louisville
Summer 2012	Kylan Nelson, High school student, James Graham Brown Cancer Center Summer Research Internship, University of Louisville
Fall 2012	Amanda Speller, Undergraduate co-op student, Department of Bioengineering, University of Louisville

Summer 2013	Adrian Turcu, High school student, James Graham Brown Cancer Center Summer Research Internship, University of Louisville
Summer 2014	Nicholas Allen, Undergraduate co-op student, Department of Bioengineering, University of Louisville
Summer 2014	Mary-Beth Hatch, Medical student, Summer Research Scholar Program Internship, University of Louisville
Summer 2014	Megan Prendergast, High school student, James Graham Brown Cancer Center Summer Research Internship, University of Louisville
2014–2015	Manon Granger-Delacroix, International M.Sc. student, Ecole Supérieure de Chimie Organique et Minérale (ESCOM), Compiègne, France
Spring 2015	Martial Millet, International undergraduate student, Université d'Auvergne, Clermont-Ferrand, France
Summer 2015	Rajita Kumar, Medical student, Summer Research Scholar Program Internship, University of Louisville
Fall 2015	Michael Eisenhut, Masters student rotation, Department of Biochemistry and Molecular Genetics, University of Louisville
Fall 2015	Phillip Chuong, Honors Thesis student, Department of Biology, University of Louisville
Spring 2016–Present	Mary-Beth Hatch, Distinction in Research Track, University of Louisville School of Medicine
Spring 2016	Andrew McGown, International graduate student, Department of Biosciences, University of Salford, England
Spring 2017	Oceane Bouvet, International undergraduate student, Université d'Auvergne, Clermont-Ferrand, France
Summer 2017	Taylor Nguyen, Medical student, Summer Research Scholar Program Internship, University of Louisville
Spring 2018–Present	Taylor Nguyen, Distinction in Research Track, University of Louisville School of Medicine
Fall 2017	Velma Shang, Ph.D. student rotation, Department of Biochemistry and Molecular Genetics, University of Louisville

Faculty Mentoring:

Spring 2016	Olga Abian, Ph.D., Aragon Health Science Institute, University of Zaragoza, Spain
09/2017 – Present	Gabriela Schneider, Ph.D., Department of Medicine, University of Louisville

CLINICAL ACTIVITIES

Not Applicable

GRANTS AND CONTRACTS**CURRENT**

National Institutes of Health R01AI129959 (Garbett, PI)

Title: Enhanced diagnostic assessment in lupus using differential scanning calorimetry

Project period: 05/05/2017–04/30/2022

Award: \$1,750,979 total

Role: Principal Investigator

National Institutes of Health R01GM112721 (Schaner-Tooley, PI)

Title: Deciphering the Code of N-terminal Post-translational Modification

Project period: 08/01/2015–06/30/2020

Award: \$1,501,711 total

Role: Collaborator

Wake Forest University Health Sciences / National Institutes of Health R01EB020125 (McNally, PI)

Title: Theranostic nanoparticles for detection and treatment of pancreatic cancer

Project period: 05/03/2017–06/30/2020

Award: \$8,113 subaward Year 3 total costs

Role: Subaward Principal Investigator

Wake Forest University Health Sciences / National Institutes of Health R01CA212350 (McNally, PI)

Title: Stroma targeted theranostic nanoparticles for pancreatic cancer

Project period: 06/01/2017–05/31/2022

Award: \$5,626 subaward Year 2 total costs

Role: Subaward Principal Investigator

National Institutes of Health R01ES027778 (States, PI)

Title: Mechanism for arsenic induced carcinogenesis

Project period: 08/01/2017–07/31/2022

Award: \$420,913 Year 2 total costs

Role: Co-Investigator

Kentucky Lung Cancer Research Program (Rai, PI)

Title: Statistical Methods for Modelling and Prediction of Lung Cancer Clinical Data

Project period: 06/01/2017–05/31/2019

Award: \$150,000 total

Role: Collaborator

COMPLETED

Elsa U. Pardee Foundation (Chaires, PI)

Title: A novel calorimetric assay for characterization of the plasma proteome for cancer detection

Project period: 06/01/2007–05/31/2008

Award: \$109,305 total

Role: Investigator

Biomolecular Interaction Technologies Center (Chaires, PI)

Title: Origin of Altered Thermograms in Plasma from Diseased Individuals

Project period: 08/01/2009–07/31/2010

Award: \$50,000 total

Role: Assistant Director, Biophysical Core Facility

James Graham Brown Cancer Center, University of Louisville (Chaires, PI)

Title: A novel plasma diagnostic assay for the detection of lung cancers

Project period: 09/01/2009–06/30/2011

Award: \$50,000 total

Role: Investigator

National Institutes of Health Molecular Targets COBRE P20GM103482 (Miller, PI)
Biophysics Core Facility
Project period: 07/01/2012–06/31/2013
Award: \$141,590 total
Role: Assistant Director, Core Facility

Office of the Executive Vice President for Research and Innovation, University of Louisville Competitive Enhancement Grant (Garbett, PI)
Title: Diagnosis and management of SLE by plasma differential scanning calorimetry: evaluation of analytical performance
Project period: 01/01/2013–12/31/2013
Award: \$15,000 total
Role: Principal Investigator

National Institutes of Health R01CA175003 (Li, PI)
Title: Activating Bax as a therapeutic strategy for lung cancer
Project period: 08/01/2013–05/31/2014
Award: \$1,866,694 total
Role: Co-Investigator, Year 1

National Institutes of Health R01CA035635 (Chaires, PI)
Title: Specificity of Intercalation Reactions
Project period: 07/01/2010–06/30/2014
Award: \$97,650 annual direct costs
Role: Postdoctoral Scholar/Instructor

University of Louisville School of Medicine Collaborative Matching Grant (Garbett, PI)
Title: Profiling the plasma albuminome for clinical monitoring of melanoma
Project period: 07/01/2014–06/30/2015
Award: \$75,000 total
Role: Principal Investigator

Kim H. Glass Gift for Translational Metastatic Breast Cancer Research, University of Louisville (Garbett, PI)
Title: Early Detection of Metastatic Breast Cancer Using Differential Scanning Calorimetry
Project period: 08/01/2015–01/31/2017
Award: \$50,000 total
Role: Principal Investigator

Bay Area Lyme Foundation Emerging Leader Award pilot grant (Garbett, PI)
Title: Differential Scanning Calorimetry as a Novel Serological Diagnostic Technology for Lyme Disease
Project period: 02/01/2015–04/30/2017
Award: \$33,144 total
Role: Principal Investigator

National Institutes of Health R21CA187435 (Garbett, PI)
Title: Plasma DSC for early detection of disease and therapeutic efficacy in melanoma
Project period: 08/01/2014–07/31/2017
Award: \$358,875 total
Role: Principal Investigator

Department of Defense Lung Cancer Research Program Concept Award W81XWH-15-1-0178 (Garbett, PI)

Title: Differential Scanning Calorimetry as a New Serological Technology for Early Detection of Disease and Recurrence in Lung Cancer

Project period: 09/15/2015–09/14/2017

Award: \$150,000 total

Role: Principal Investigator

Kentucky Science and Technology Corporation COMMFUND-1517-RFP-017 (Garbett, PI)

Title: DSC Blood Test for Clinical Management of Melanoma

Project period: 01/01/2016–12/31/2017

Award: \$150,000 total

Role: Principal Investigator

PENDING

National Institutes of Health R01HL146858 (DeFilippis & Garbett, MPI)

Title: Use of plasma thermograms for diagnostic characterization of thrombotic myocardial infarction

Project period: 04/01/2019–03/31/2024

Award: \$3,442,871 total

Role: Principal Investigator

National Institutes of Health F31CA239495 (Melvin, PI)

Title: Development of a Point-of-Care Blood Diagnostic Assay Using Differential Scanning Calorimetry

Project period: 04/01/2019–03/31/2022

Award: \$113,443 total

Role: Co-Sponsor

SUBMITTED PATENTS

Garbett, N.C., and Brock, G.N. "Methods of Characterizing and/or Predicting Risk Associated with a Biological Sample Using Thermal Stability Profiles," U.S. PCT Application PCT/US16/57416, Filing date 10/17/2016

EDITORIAL WORK

Ad hoc reviewer for Acta Chimica Slovenica, Analytical Chemistry, BBA-General Subjects, Biotechnology Progress, Combinatorial Chemistry and High Throughput Screening, Drug Discovery Today, FEBS letters, International Journal of Cancer, International Journal of Pharmaceutics, Journal of Proteome Research, Journal of Thermal Analysis and Calorimetry, Langmuir, Medicinal Research Reviews, Methods, Nucleic Acids Research, PLOS ONE, Proteomes, Scientific Reports, Thermochemica Acta, Wiley Encyclopedia of Chemical Biology

ABSTRACTS AND PRESENTATIONS

Oral Presentations: National/International Meetings

1. 21st Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Oct 7–10, 2007), "Calorimetry outside the box: a new window into the plasma proteome"
2. North American Thermal Analysis Society – Philadelphia, PA (Aug 15–18, 2010), "Calorimetry Outside the Box: A New Window into Plasma Proteomics"

3. TA Instruments 2012 Users Meeting and Symposium – New Orleans, LA (Apr 29–May 2, 2012), “Calorimetry for Clinical Monitoring”
4. 2012 AAPS National Biotechnology Conference – San Diego, CA (May 21–23, 2012), “Calorimetry of Blood Plasma and Drug Binding Interactions”
5. Department of Biochemistry Seminar, University of Mississippi Medical Center (Apr 23, 2013), “Diagnostic application of plasma protein calorimetry”
6. TA Instruments Seminar: Microcalorimetry & HDX: Advanced Tools for the Characterization of High Order Structure-Function Relationships, Waters – Milford, MA (May 6, 2013), “Plasma protein calorimetry for clinical diagnostic applications”
7. TA Instruments Microcalorimetry Seminar: Protein Binding and Structure Studies – Indianapolis, IN (Dec 5, 2013), “Plasma protein calorimetry for clinical diagnostic applications”
8. TA Instruments Microcalorimetry Webinar (Feb 11, 2014), “Plasma protein calorimetry for clinical diagnostics”
9. TA Instruments Microcalorimetry Seminar – Research Triangle Park, NC (Jun 12, 2014), “Clinical application of DSC”
10. TA Instruments 2015 Users Meeting and Symposium – San Antonio, TX (Feb 15–18, 2015), “Calorimetric Analysis of Biofluids for Clinical Monitoring”
11. Pacifichem – The International Chemical Congress of Pacific Basin Societies 2015 – Honolulu, HI (Dec 15, 2015), “Plasma thermograms: Heat profiles of blood for the detection and monitoring of cancer”
12. Pacifichem – The International Chemical Congress of Pacific Basin Societies 2015 – Honolulu, HI (Dec 19, 2015), “Differential scanning calorimetry as a new tool for biomarker research”
13. 12th World Cancer Conference – London, England (Sep 26, 2016), “Plasma thermograms - a new approach for cancer biomarker studies”
14. Joint Meeting of the 73rd Calorimetry Conference and the 25th International Conference on Chemical Thermodynamics (CalCon-ICCT 2018) – Lake Tahoe, CA (Aug 7, 2018), “Use of DSC for the analysis of biofluids”

Oral Presentations: Local/Regional Meetings

1. Chemistry Department Postgraduate Symposium – University of Kent at Canterbury, England (Jul 1997), “Synthesis and Application of PAMAM Dendrimeric Systems”
2. Chemistry Department Postgraduate Symposium – University of Kent at Canterbury, England (Oct 1998), “Synthesis, Characterization and Pharmaceutical Application of Dendrimeric Materials”
3. Brown Cancer Center Research Seminar, University of Louisville (Feb 6, 2007), “The Biophysical Core Facility”
4. 59th Southeast Regional Meeting of the American Chemical Society, Greenville, SC (Oct 24–27, 2007), “G-Quadruplex DNA: Thermodynamic and Spectroscopic Characterization”
5. Molecular Targets Seminar, University of Louisville (Jun 7, 2012), “Calorimetry for Clinical Surveillance and ADME Screening”
6. Molecular Targets Seminar, University of Louisville (Jul 9, 2013), “Biophysical Core Facility”
7. James Graham Brown Cancer Center Colloquia on Cancer Biology and Therapeutics, University of Louisville, Louisville, KY (May 7, 2014), “Clinical application of DSC”
8. Research! Louisville 2014 Cancer Biology & Therapeutics Symposium – University of Louisville, Louisville, KY (Sep 16–19, 2014), “Plasma Thermograms as a Universal Method to Detect Cancer”
9. Department of Biochemistry and Molecular Genetics Seminar, University of Louisville, Louisville, KY (Dec 2, 2014), “Biophysical Studies of Biofluids for Clinical Monitoring”
10. 1st Annual Twisted Pink Foundation Conference on Metastatic Breast Cancer – Louisville, KY (May 7, 2015), “Early Detection of Metastatic Breast Cancer Using Differential Scanning Calorimetry”
11. University of Louisville – Eli Lilly meeting on industry-academia relations – University of Louisville, Louisville, KY (Feb 24, 2016), “Disease Monitoring using Plasma Thermograms”
12. Brown Cancer Center Summer Intern Program Seminar Series – Louisville, KY (Jul 12, 2016), “Plasma Thermograms: Heat profiles of blood for the detection and monitoring of cancer”
13. James Graham Brown Cancer Center Colloquia on Cancer Biology and Therapeutics, University of Louisville, Louisville, KY (Aug 10, 2016), “Developing analysis methods for thermograms” (with Dr. Olga Abian)

14. TA Instruments – Dana Farber Cancer Institute Seminar: Characterizing Molecular Binding Events by ITC – Boston, MA (Apr 24, 2018), “Assessment of biomolecule-drug interactions using fluorescence thermal shift and enthalpy screen assays”

Poster Presentations: National/International Meetings (Presenter underlined)

1. Garbett, N.C., Beezer, A.E., Connor, J.A. and Mitchell, J.C.: Diffusion Analysis Using a Modified Taylor-Aris Dispersion Technique. Chemistry Research for Britain – London, England (Feb 7, 1997)
2. Garbett, N.C., Beezer, A.E., Esfand, R., Hardy, M.J., Mitchell, J.C. and Wylie, L.A.: Synthesis of Hyperbranched Polymers and their Potential as Novel Pharmaceutical Agents. Fifth Chemical Congress of North America – Cancun, Mexico (Nov 11–15, 1997)
3. Garbett, N.C., Mitchell, J.C., Beezer, A.E., Connor, J.A., Hardy, M.J., Jenkins, T.C. and Wylie, L.A.: Dendrimers as Anti-Cancer Agents and Drug Carriers. Millennial World Congress of Pharmaceutical Sciences – San Francisco, CA (Apr 16–20, 2000)
4. Garbett, N.C. and Graves, D.E.: Thermodynamic Mechanisms of Actinomycin D-DNA Interactions is Sequence Specific. 47th Annual Meeting of the Biophysical Society – San Antonio, TX (Mar 1–5, 2003)
5. Miller, J.J., Garbett, N.C., Jenson, A.B., Miller, D.M. and Chaires, J.B.: Interrogation of the plasma proteome with differential scanning calorimetry. American Association for Clinical Chemistry Oak Ridge Conference – Harnessing New Technology for Clinical Diagnostics – St. Louis, MO (Apr 19–20, 2007)
6. Garbett, N.C., Mekmaysy, C. and Chaires, J.B.: Use of Analytical Ultracentrifugation in the Characterization of Quadruplex Structure. First International Meeting on Quadruplex DNA – Louisville, KY (Apr 21–24, 2007)
7. Mekmaysy, C., Ragazzon, P., Garbett, N.C. and Chaires, J.B.: The Structure of 5'-G_nT₄G_n Dimeric G-quadruplexes. First International Meeting on Quadruplex DNA – Louisville, KY (Apr 21–24, 2007)
8. Garbett, N.C., Miller, J.J., Jenson, A.B., Miller, D.M. and Chaires, J.B.: Proteomic Profiling Method for Diagnosis and Therapeutic Monitoring. Biotechnology Industry Organization International Convention–Boston, MA (May 6–9, 2007)
9. Garbett, N.C., Metzinger, D., Parker, L., Helm, C.W., Jenson, A.B. and Chaires, J.B.: Differential Scanning Calorimetry: A novel tool for discriminating intraepithelial neoplasia and invasive carcinoma of the cervix. 12th Biennial Meeting: International Gynecologic Cancer Society – Bangkok, Thailand (Oct 25–28, 2008)
10. Xiang, D., Garbett, N.C., Chaires, J.B., Laber, D.L. and Kloecker, G.H.: Plasma thermogram profiling: A novel biomarker for lung cancer. 2009 ASCO Annual Meeting–Orlando, FL (May 29–June 2, 2009). Conference abstract published in Journal of Clinical Oncology 27(15 Supplement):e22074-e22074, May 2009. DOI: 10.1200/jco.2009.27.15_suppl.e22074
11. Xiang, D., Garbett, N.C., Chaires, J.B. and Kloecker, G.H.: Differential Scanning Calorimetry of Blood Plasma for Lung Cancer Diagnosis. 2010 ASCO Annual Meeting–Chicago, IL (Jun 4–8, 2010). Conference abstract published in Journal of Clinical Oncology 28(15 Supplement):e21085-e21085, May 2010. DOI: 10.1200/jco.2010.28.15_suppl.e21085
12. Joos, N., Garbett, N., Chaires, J.B., Bumpous, J.M., Zacharias, W. and Shumway, B.: Serum and Saliva Analysis by Differential Scanning Calorimetry as a Novel Diagnostic Modality in Head and Neck Cancer: A Pilot Study. Triological Society 2011 Combined Sections Meeting – Scottsdale, Arizona (Jan 27–29, 2011). Conference poster published in The Laryngoscope 121(S4): S126, 2011. DOI: 10.1002/lary.22003.
13. Ball, W.J., Tabet, M.R., Tabaja, N., Garbett, N.C. and Norman, A.B.: A re-engineered anticocaine monoclonal antibody: Determining h2E2 thermostability and thermodynamics of ligand binding. 2014 Annual Meeting of the College on Problems of Drug Dependence–San Juan, Puerto Rico (Jun 14–19, 2014). Conference abstract published in Drug & Alcohol Dependence 146:e214-e215, January 2015. DOI:10.1016/j.drugalcdep.2014.09.051
14. Khanal, A., Kimbrough, C.W., Garbett, N., Burlison, J.A., Grizzle, W.E. and McNally, L.R.: Syndecan-1 targeted mesoporous silica-coated gold nanorods act as theranostic agents for in vivo detection of orthotopic pancreatic tumors using multispectral optoacoustic tomography. American Association for Cancer Research Annual Meeting–Philadelphia, PA (Apr 18–22, 2015). Conference abstract published in Cancer Research 75(15 Supplement):1500-1500, Aug 2015. DOI: 10.1158/1538-7445.AM2015-1500

15. Schneider, G., **Garbett, N.C.**, Bryndza, E., Poniewierska-Baran, A., Merchant, M.L., Serwin, K., Sellers, Z.P., Dolegowska, B. and Ratajczak, M.: Novel evidence that blood plasma vitronectin is a major chemoattractant for cancer cells and its pro-migratory activity is suppressed/chaperoned after binding to fibrinogen. American Association for Cancer Research Annual Meeting—New Orleans, LA (Apr 16–20, 2016). Conference abstract published in Cancer Research 76(14 Supplement):1698-1698, July 2016. DOI:10.1158/1538-7445.AM2016-1698

Poster Presentations: Local/Regional Meetings (Presenter underlined; # indicates presentation by a student or trainee from Dr. Garbett's group)

1. **Garbett, N.C.**, Graves, D.E. and Chaires, J.B.: The Sequence and Structural Selectivity of Nucleic Acid Binding of the Natural Product Anti-Cancer Agent Ellipticine. University of Mississippi Chapter of Sigma Xi and University of Mississippi Office of Research Poster Symposium – University of Mississippi, MS (Apr 4, 2002). **Award: Winner, Best poster in the chemistry category**
2. **Garbett, N.C.** and Graves, D.E.: Thermodynamic Binding Mechanism(s) for Anti-Cancer Drug-DNA Interactions Are Governed by the DNA Sequence. University of Alabama at Birmingham Comprehensive Cancer Center Annual Research Retreat – Birmingham, AL (Oct 27, 2003)
3. **Garbett, N.C.** and Graves, D.E.: Role of DNA Sequence on Ligand-DNA Interactions. 55th Southeast Regional Meeting of the American Chemical Society – Atlanta, GA (Nov 16–19, 2003)
4. **Garbett, N.C.** and Chaires, J.B.: The Biophysical Core Facility. James Graham Brown Cancer Center 4th Annual Retreat – Louisville, KY (Sep 14, 2005)
5. **Garbett, N.C.** and Chaires, J.B.: The Biophysical Core Facility. James Graham Brown Cancer Center 5th Annual Retreat – Louisville, KY (Sep 29, 2006)
6. Ragazzon, P., **Garbett, N.C.**, Mekmaysy, C. and Chaires, J.B.: Competition Dialysis: A new tool for identifying molecular targets. James Graham Brown Cancer Center 5th Annual Retreat – Louisville, KY (Sep 29, 2006)
7. Mekmaysy, C., Ragazzon, P., **Garbett, N.C.** and Chaires, J.B.: The Structure and Function of G-quadruplexes. James Graham Brown Cancer Center 5th Annual Retreat – Louisville, KY (Sep 29, 2006)
8. Mekmaysy, C., Ragazzon, P., **Garbett, N.C.** and Chaires, J.B.: The Structure and Stability of G-quadruplexes. 20th Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Oct 7–10, 2006)
9. Ragazzon, P., **Garbett, N.C.**, Mekmaysy, C. and Chaires, J.B.: Competition dialysis: a new tool for identifying molecular targets. 20th Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Oct 7–10, 2006)
10. Ragazzon, P., **Garbett, N.C.**, Mekmaysy, C. and Chaires, J.B.: G-Quadruplex DNA: Thermodynamic and Spectroscopic Characterization. 21st Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Oct 7–10, 2007)
11. **Garbett, N.C.**, Miller, J.J., Jenson, A.B. and Chaires, J.B.: Calorimetry outside the box: a new window into the plasma proteome. 21st Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Oct 7–10, 2007)
12. Mekmaysy, C., Ragazzon, P., **Garbett, N.C.** and Chaires, J.B.: The Structure and Stability of G-quadruplex. 21st Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Oct 7–10, 2007)
13. **Garbett, N.C.**, Miller, J.J., Jenson, A.B. and Chaires, J.B.: Calorimetry outside the box: a new window into the plasma proteome. Research! Louisville 2007 – University of Louisville, Louisville, KY (Oct 16–19, 2007)
14. **Garbett, N.C.**, Miller, J.J., Jenson, A.B. and Chaires, J.B.: Calorimetry outside the box: a new window into the plasma proteome. James Graham Brown Cancer Center 6th Annual Retreat – Louisville, KY (Nov 28, 2007)
15. **Garbett, N.C.** and Chaires, J.B.: The Biophysical Core Facility. James Graham Brown Cancer Center 6th Annual Retreat – Louisville, KY (Nov 28, 2007)
16. Mekmaysy, C., Ragazzon, P., **Garbett, N.C.** and Chaires, J.B.: The Structure and Stability of G-quadruplex. James Graham Brown Cancer Center 6th Annual Retreat – Louisville, KY (Nov 28, 2007)
17. Ragazzon, P., **Garbett, N.C.**, Mekmaysy, C. and Chaires, J.B.: G-quadruplex DNA: thermodynamic and spectroscopic characterization. James Graham Brown Cancer Center 6th Annual Retreat – Louisville, KY (Nov 28, 2007)
18. Mishra, A., Eaton, J.E., Willer, S.S., **Garbett, N.C.** and Chaires, J.B.: Deconstructing the Plasma Protein Thermogram in Patients with Inflammatory and Neoplastic Diseases. Research! Louisville 2008 – University of Louisville, Louisville, KY (Oct 13–17, 2008). **Award: Winner, Clinical residents**

19. Xiang, D., **Garbett, N.C.**, Chaires, J.B. and Kloecker, G.H.: Plasma Thermogram Profiling: A Novel Approach in Earlier Detection of Lung Cancer. Research! Louisville 2008 – University of Louisville, Louisville, KY (Oct 13–17, 2008). **Award: Winner, Clinical research fellows**
20. **Garbett, N.C.**, Metzinger, D., Parker, L., Helm, C.W., Jenson, A.B. and Chaires, J.B.: Differential Scanning Calorimetry: A novel tool for discriminating intraepithelial neoplasia and invasive carcinoma of the cervix. James Graham Brown Cancer Center 7th Annual Retreat – Louisville, KY (Oct 29, 2008)
21. **Garbett, N.C.** and Chaires, J.B.: The Biophysical Core Facility. James Graham Brown Cancer Center 7th Annual Retreat – Louisville, KY (Oct 29, 2008)
22. Mishra, A., Eaton, J.E., Willer, S.S., **Garbett, N.C.** and Chaires, J.B.: Deconstructing the Plasma Protein Thermogram in Patients with Inflammatory and Neoplastic Diseases. James Graham Brown Cancer Center 7th Annual Retreat – Louisville, KY (Oct 29, 2008)
23. Mishra, A., Xiang, D., **Garbett, N.C.**, Chaires, J.B. and Kloecker, G.H.: Differential Scanning Calorimetry: Employing the Plasma Proteome for Early Lung Cancer Detection. James Graham Brown Cancer Center 7th Annual Retreat – Louisville, KY (Oct 29, 2008)
24. **Garbett, N.C.**, Metzinger, D., Parker, L., Helm, C.W., Jenson, A.B. and Chaires, J.B.: Differential Scanning Calorimetry: A novel tool for discriminating intraepithelial neoplasia and invasive carcinoma of the cervix. Joint UK/UL Lung Cancer Symposium – Louisville, KY (Nov 21, 2009)
25. **Garbett, N.C.**, Metzinger, D., Parker, L., Helm, C.W., Jenson, A.B. and Chaires, J.B.: Differential Scanning Calorimetry: A novel tool for discriminating intraepithelial neoplasia and invasive carcinoma of the cervix. 6th Kentucky Innovation and Entrepreneurship Conference – Lexington, KY (Apr 6, 2010)
26. DeLeeuw, L., **Garbett, N.C.** and Chaires, J.B.: Integrated Rapid Fluorescence Screening and Biophysical Characterization of Plasma Protein Drug Binding. James Graham Brown Cancer Center 10th Annual Retreat – Louisville, KY (Oct 28, 2011)
27. DeLeeuw, L., Chaires, J.B. and **Garbett, N.C.**: Clinical Calorimetry: Diagnostic Profiling and Drug Binding Interactions in Blood Plasma. 26th Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Sep 22–25, 2012)
28. Speller, A. #, Dooley, L., Bumpous, J., Zacharias, W. and **Garbett, N.C.**: Saliva Analysis by Differential Scanning Calorimetry in Head and Neck Cancer. James Graham Brown Cancer Center 11th Annual Retreat – Louisville, KY (Oct 26, 2012)
29. Kaliappan, A., DeLeeuw, L., Miller, M.C., Chaires, J.B. and **Garbett, N.C.**: In search of disease associated blood components which mediate alterations in DSC thermograms. James Graham Brown Cancer Center 12th Annual Retreat – Louisville, KY (Oct 25, 2013)
30. Hatch, M. #, Kaliappan, A., Allen, N. and **Garbett, N.C.**: Calorimetry of the Plasma Proteome in Patients with Ovarian Cancer. Research! Louisville 2014 – University of Louisville, Louisville, KY (Sep 16–19, 2014)
31. Prendergast, M. #, Kaliappan, A., and **Garbett, N.C.**: Differential Scanning Calorimetry in Prostate Cancer. Research! Louisville 2014 – University of Louisville, Louisville, KY (Sep 16–19, 2014)
32. **Garbett, N.C.**, Allen, N. and Kaliappan, K.: Characterization of plasma thermogram changes in melanoma. 28th Annual Gibbs Conference on Biothermodynamics – Carbondale, IL (Sep 20–23, 2014)
33. Allen, N. #, Hatch, M., Kaliappan, A., Miller, C.M. and **Garbett, N.C.**: Exploring the Melanoma Proteome using Differential Scanning Calorimetry. James Graham Brown Cancer Center 14th Annual Retreat – Louisville, KY (Oct 17, 2014). **Award: 3rd place, Roving award category**
34. Prendergast, M. #, Kaliappan, A., and **Garbett, N.C.**: Differential Scanning Calorimetry in Prostate Cancer. James Graham Brown Cancer Center 14th Annual Retreat – Louisville, KY (Oct 17, 2014). **Award: 2nd place, Brown Cancer Center Summer Research Program**
35. Hatch, M. #, Kaliappan, A., Allen, N. and **Garbett, N.C.**: Calorimetry of the Plasma Proteome in Patients with Ovarian Cancer. James Graham Brown Cancer Center 14th Annual Retreat – Louisville, KY (Oct 17, 2014)
36. Granger-Delacroix, M. #, Allen, N., Kaliappan, A., and **Garbett, N.C.**: Characterization of plasma thermogram modulation using mass spectrometry. James Graham Brown Cancer Center 14th Annual Retreat – Louisville, KY (Oct 17, 2014)

37. Nguyen, T.Q. #, Kaliappan, A., Allen, N., Barousse Hall, M., Schneider, G., Chesney, J.A., Wilkey, D., Kendrick, S.K., Merchant, M.L., Brock, G.N. and **Garbett, N.C.**: Development of novel diagnostic methodologies for diagnosis and monitoring in melanoma. Research! Louisville 2017 – University of Louisville, Louisville, KY (Sep 11–15, 2017). **Award: 3rd place, Norbert J. Burzynski award professional student category**

PUBLICATIONS

PEER-REVIEWED MANUSCRIPTS (* = corresponding author)

1. Ainscow, T.A., Aldalur, I., Beezer, A.E., Connor, J.A., **Garbett, N.C.**, Mitchell, J.C., Page, A.L., Tindale, N., Turner, K.A., and Willson, R.J.: Influence of Alkyl Chain Length and Structure on the Extraction of Copper (II) from Aqueous Acid by 5-Alkyl-2-hydroxybenzaldoximes in Hydrocarbon Solvents: Diffusion Coefficients of Extractants and Their Complexes. *J. Colloid Int. Sci.* 213(1):87-91, 1999
2. Murphy, P.M., Phillips, V.A., Jennings, S.A., **Garbett, N.C.**, Chaires, J.B., Jenkins, T.C., and Wheelhouse, R.T.: Biarylpyrimidines: a new class of ligand for high-order DNA recognition. *Chem. Commun.* 10:1160-1161, 2003. PMID: 12778714.
3. **Garbett, N.C.**, Hammond, N.B., and Graves, D.E.: Influence of the Amino Substituents in the Interaction of Ethidium Bromide with DNA. *Biophys. J.* 87(6):3974-3981, 2004. PMID: 15465858.
4. Nagarajan, M., Morrell, A., Antony, S., Kohlhagen, G., Agama, K., Pommier, Y., Ragazzon, P.A., **Garbett, N.C.**, Chaires, J.B., Hollingshead, M., and Cushman, M.: Synthesis and Biological Evaluation of Bisindenoisoquinolines as Topoisomerase I Inhibitors. *J. Med. Chem.* 49(17):5129-5140, 2006. PMID: 16913702.
5. Wheelhouse, R.T., Jennings, S.A., Phillips, V.A., Pletsas, D., Murphy, P.M., **Garbett, N.C.**, Chaires, J.B., and Jenkins, T.C.: Design, Synthesis, and Evaluation of Novel Biarylpyrimidines: A New Class of Ligand for Unusual Nucleic Acid Structures. *J. Med. Chem.* 49(17):5187-5198, 2006. PMID: 16913707.
6. **Garbett, N.C.**, Miller, J.J., Jenson, A.B. and Chaires, J.B.: Ligand Binding Alters the Calorimetric Thermogram of Albumin. *J. Clin. Ligand Assay* 29(4):194–197, 2006
7. Spink, C.H., **Garbett, N.** and Chaires, J.B.: Enthalpies of DNA Melting in the Presence of Osmolytes. *Biophys. Chem.* 126(1-3):176-185, 2007. PMID: 16920250.
8. Ragazzon, P.A., **Garbett, N.C.** and Chaires, J.B.: Competition Dialysis: A Method for the Study of Structural Selective Nucleic Acid Binding. *Methods* 42(2):173-182, 2007. PMID: 17472899.
9. **Garbett, N.C.**, Miller, J.J., Jenson, A.B. and Chaires, J.B.: Calorimetric Analysis of the Plasma Proteome. *Semin. Nephrol.* 27(6):621-626, 2007. PMID: 18061844.
10. **Garbett, N.C.**, Miller, J.J., Jenson, A.B., Miller, D.M. and Chaires, J.B.: Interrogation of The Plasma Proteome with Differential Scanning Calorimetry. *Clin. Chem.* 53(11): 2012-2014, 2007. PMID: 18030697.
11. **Garbett, N.C.**, Ragazzon, R.A. and Chaires, J.B.: Circular dichroism to determine binding mode and affinity of ligand-DNA interactions. *Nat. Prot.* 2: 3166-3172, 2007. PMID: 18079716.
12. **Garbett, N.C.**, Miller, J.J., Jenson, A.B. and Chaires, J.B.: Calorimetry outside the box: a new window into the plasma proteome. *Biophys. J.* 94(4):1377-1383, 2008. PMID: 17951300.
 *Analytical Currents. *Anal. Chem.* 80(1):4, 2008 – research on the plasma calorimetry assay (*Biophys. J.* 94(4):1377-1383) was selected as a research news article by Analytical Chemistry
 *Currents. *J. Proteome Res.* 7(1):20, 2008 – research on the plasma calorimetry assay (*Biophys. J.* 94(4):1377-1383) was selected as a research news article by Journal of Proteome Research
13. Mekmaysy, C.S., Petraccone, L., **Garbett, N.C.**, Ragazzon, P.A., Gray, R.D., Trent, J.O. and Chaires, J.B.: Effect of O6-methylguanine on the stability of G-quadruplex DNA. *J. Am. Chem. Soc.* 130(21):6710-6711, 2008. PMID: 18447358.
14. **Garbett, N.C.**, Mekmaysy, C.S., Helm, C.W., Jenson, A.B. and Chaires, J.B.: Differential scanning calorimetry of blood plasma for clinical diagnosis and monitoring. *Exp. Mol. Pathol.* 86:186-191, 2009. PMID: 19146849.

15. Petraccone, L., **Garbett, N.C.**, Chaires, J.B. and Trent, J.O.: An Integrated Molecular Dynamics (MD) and Experimental Study of Higher Order Human Telomeric Quadruplexes. *Biopolymers* 93(6):533-548, 2010. PMID: 20095044.
 16. Wheelhouse, R.T., **Garbett, N.C.**, Buurma, N.J. and Chaires, J.B.: Probing the Molecular Recognition of a DNA-RNA Hybrid Duplex. *Angew. Chem. Int. Ed.* 49(18):3207-3210, 2010. PMID: 20352639.
 17. Fish, D.J., Brewood, G.P., Kim, J.S., **Garbett, N.C.**, Chaires, J.B. and Benight, A.S.: Statistical analysis of plasma thermograms measured by differential scanning calorimetry. *Biophys. Chem.* 152(1-3):184-190, 2010. PMID: 20961680.
 18. Dignam, J.D., Guo, J., Griffith, W.P., **Garbett, N.C.**, Holloway, A. and Mueser, T.: Allosteric Interaction of Nucleotides and tRNA^{ala} with *E. coli* Alanyl-tRNA Synthetase. *Biochemistry* 50(45):9886-9900, 2011. PMID: 21985608.
 19. Wisniewski, M., **Garbett, N.C.**, Fish, D.J., Brewood, G.P., Miller, J.J., Chaires, J.B. and Benight, A.S.: Differential Scanning Calorimetry in Molecular Diagnostics. *In Vitro Diagnostic Technology.* 17(6):29-34, 2011
 20. Petraccone, L., Spink, C.H., Trent, J.O., **Garbett, N.C.**, Mekmaysy, C.S., Giancola, C. and Chaires, J.B.: Structure and Stability of Higher-Order Human Telomeric Quadruplexes. *J. Am. Chem. Soc.* 133(51):20951-20961, 2011. PMID: 22082001.
 21. **Garbett, N.C.*** and Chaires, J.B.: Thermodynamic Studies for Drug Design and Screening. *Expert Opin. Drug Discov.* 7(4):299-314, 2012. PMID: 22458502.
 22. Rai, S.N., Pan, J., Cambon, A., Chaires, J.B. and **Garbett, N.C.**: Group Classification based on High-Dimensional Data: Application to Differential Scanning Calorimetry Plasma Thermogram Analysis of Cervical Cancer and Control Samples. *Open Access Medical Statistics* 3:1-9, 2013.
 23. **Garbett, N.C.***, Merchant, M.L., Chaires, J.B. and Klein, J.B.: Calorimetric Analysis of the Plasma Proteome: Identification of Type I Diabetes Patients With Early Renal Function Decline. *Biochim. Biophys. Acta* 1830(10):4675-4680, 2013. PMID: 23665587.
 24. Kwon, A.M., **Garbett, N.C.** and Kloecker, G.H.: Pooled preventable death rates in trauma patients. Meta analysis and systematic review since 1990. *Eur. J. Trauma Emerg. Surg.*, 2014. DOI 10.1007/s00068-013-0364-5.
 25. **Garbett, N.C.***, Merchant, M.L., Helm, C.W., Jenson, A.B., Klein, J.B. and Chaires, J.B.: Detection of Cervical Cancer Biomarker Patterns in Blood Plasma and Urine by Differential Scanning Calorimetry and Mass Spectrometry. *PLOS ONE* 9(1):e84710, 2014. PMID: 24416269.
- *FOX 13 Tampa Bay, Health News and Updates from Dr. Joette Giovinco, Jan 8, 2014 – a news story featuring the PLOS ONE research**
- *News Medical, Jan 8, 2014 – a news article featuring the PLOS ONE research**
- *Medical Daily, Jan 8, 2014 – a news article featuring the PLOS ONE research**
- *Science Newsline, Jan 8, 2014 – a news article featuring the PLOS ONE research**
- *The Daily Mail, Jan 8, 2014 – a news article featuring the PLOS ONE research**
- *BBC News, Jan 9, 2014 – a news article featuring the PLOS ONE research**
- *The Huffington Post UK, Jan 9, 2014 – a news article featuring the PLOS ONE research**
- *International Business Times, Jan 9, 2014 – a news article featuring the PLOS ONE research**
- *The Health Site, Jan 10, 2014 – a news article featuring the PLOS ONE research**
- *Discovery Zone, Jan 12, 2014 – a news article featuring the PLOS ONE research**
- *The Courier Journal (Louisville) pp. A1-2, Jan 13, 2014 – a news article featuring the PLOS ONE research**
- *ProteoMonitor Magazine, Jan 17, 2014 – a news article featuring the PLOS ONE research**
- *Lab Medica, Jan 22, 2014 – a news article featuring the PLOS ONE research**
- *Smart Brief, Jan 22, 2014 – a news article featuring the PLOS ONE research**
26. **Garbett, N.C.***, Mekmaysy, C.S., DeLeeuw, L. and Chaires, J.B.: Clinical application of plasma thermograms. Utility, practical approaches and considerations. *Methods* 76:41-50, 2015. PMID: 25448297.
 27. Khanal, A., Ullum, C., Kimbrough, C.W., **Garbett, N.C.**, Burlison, J.A., McNally, M.W., Chuong, P., El-Baz, A.S., Jasinski, J.B. and McNally, L.R.: Tumor targeted mesoporous silica-coated gold nanorods facilitate detection of pancreatic tumors using multispectral optoacoustic tomography. *Nano Research* 8(12):3864-3877, 2015.

28. **Garbett, N.C.*** and Brock, G.N.: Differential scanning calorimetry as a complementary diagnostic tool for the evaluation of biological samples. *Biochim. Biophys. Acta* 1860(5):981-989, 2016. PMID: 26459005.
29. Kwon, A.M., Ren, D., Ouyang, M. and **Garbett, N.C.**: Robust Functional Profile Identification for DSC Thermograms. *Proceedings of the 9th EAI International Conference on Bio-inspired Information and Communications Technologies (formerly BIONETICS)*, pp. 497-501, 2016. DOI: 10.4108/eai.3-12-2015.2262549.
30. Schneider, G., Bryndza, E., Poniewierska-Baran, A., Serwin, K., Suszynska, M., Sellers, Z.P., Merchant, M.L., Kaliappan, A., Ratajczak, J., Kucia, M., **Garbett, N.C.** and Ratajczak, M.Z.: Evidence that vitronectin is a potent migration-enhancing factor for cancer cells chaperoned by fibrinogen: a novel view of the metastasis of cancer cells to low-fibrinogen lymphatics and body cavities. *Oncotarget* 7(43):69829-69843, 2016. PMID: 27634880.
31. Crimmins, D.L., Herries, E.M., Ohlendorf, M.F., Brada, N.A., **Garbett, N.C.**, Zipfel, G.J., Schindler, S.E. and Ladenson, J.H.: Double Monoclonal Immunoassay for Quantifying Human Visinin-Like Protein-1 in CSF. *Clin. Chem.* 63(2): 603-604, 2017. PMID: 27986783.
32. Shields, K.M., Tooley, J.G., Petkowski, J.J., Wilkey, D.W., **Garbett, N.C.**, Merchant, M.L., Cheng, A. and Schaner Tooley, C.E.: Select human cancer mutants of NRMT1 alter its catalytic activity and decrease N-terminal trimethylation. *Protein Sci.* 2017. Doi: 10.1002/pro.3202. PMID: 28556566.
33. Kendrick, S.K., Zheng, Q., **Garbett, N.C.*** and Brock, G.N.: Application and interpretation of functional data analysis techniques to differential scanning calorimetry data from lupus patients. *PLOS ONE* 12(11):e0186232, 2017. PMID: 29121669.
34. **Garbett, N.C.***, Brock, G.N., Chaires, J.B., Mekmaysy, C.S., DeLeeuw, L., Sivils, K.L., Harley, J.B., Rovin, B.H., Kulsekera, K.B. and Jarjour, W.N.: Characterization and classification of lupus patients based on plasma thermograms. *PLOS ONE* 12(11):e0186398, 2017. PMID: 29149219.
35. Velazquez-Campoy, A.*, Vega, S., Sanchez-Gracia, O., Lanás, A., Rodrigo, A., Kaliappan, A., Hall, M.B., Nguyen, T.Q., Brock, G.N., Chesney, J.A., **Garbett, N.C.*** & Abian, O.*: Thermal liquid biopsy for monitoring melanoma patients under surveillance during treatment: A pilot study. *Biochim. Biophys. Acta* 1862(8): 1701-1710, 2018. PMID: 29705200

REVIEW PUBLICATIONS (PEER-REVIEWED)

1. **Garbett, N.C.**, and Graves, D.E.: Extending Nature's Leads: The Anticancer Agent Ellipticine. *Curr. Med. Chem. – Anti-Cancer Agents* 4(2):149-172, 2004 (**invited review**). PMID: 15032720.

BOOKS CHAPTERS (PEER-REVIEWED)

1. **Garbett, N.C.** and Chaires, J.B.: Methods for quantitative characterization of ligand-DNA binding interactions. In Lee, M. and Strekowski, L. (Eds.): *Synthetic and Biophysical Studies of DNA Binding Compounds*. Kerala, India, Transworld Research Network, 2007, pp. 1-38
2. **Garbett, N.C.** and Chaires, J.B.: Binding: A Polemic and Rough Guide. In Correia, J.J. and Detrich, III, H.W. (Eds.): *Methods in Cell Biology*. Amsterdam, Elsevier Inc., 2008, Vol. 84, pp. 3-23. PMID: 17964926.
3. **Garbett, N.C.**, Mekmaysy, C.S. and Chaires, J.B.: Sedimentation Velocity Ultracentrifugation Analysis for Hydrodynamic Characterization of G-Quadruplex Structures. In Baumann, P. (Ed.): *Methods in Molecular Biology*. New York, NY, Humana Press, 2010, Vol. 608, pp. 97-120. PMID: 20012418.
4. **Garbett, N.C.***: The Use of Calorimetry to Study Ligand-DNA Interactions. In Aldrich-Wright, J. (Ed.): *Metallointercalators: Synthesis and Techniques to Probe Their Interactions with Biomolecules*. Wien, Germany, Springer-Verlag, 2011, pp. 299-324

SUBMITTED/IN PREPARATION

1. Buscaglia, R., **Garbett, N.C.**, and Kamarianakis, I.: Ensemble of segmented functional nonparametric classifiers (in preparation).

2. Hoff da Silva, J.M., Berengue, O.M., **Garbett, N.C.**, and Hoff Brait, D.R.: Blood plasma differential scanning calorimetry analysis via Hausdorff Dimension (in preparation).
3. Rai, S.N., Srivastava, S., Pan, J., Wu, X., Rai, S.P., Chesney, J.A., Chaires, J.B., and **Garbett, N.C.**: Group classification for high dimensional data with application to differential scanning calorimetry plasma thermogram analysis of cervical cancer, lung cancer and control samples (in preparation).
4. Nguyen, T.Q., Kendrick, S.K., Kaliappan, A., Hall, M.B., Chesney, J.A., Brock, G.N., **Garbett, N.C.***: Plasma thermogram analysis for disease classification and monitoring of melanoma patients
5. Schneider, G., Kendrick, S.K., Kaliappan, A., Hall, M.B., DeSpirito, P.C., Wilkey, D., Wiese, T.A., Rivas-Perez, H., Kloecker, G.H., Merchant, M.L., Brock, G.N., **Garbett, N.C.***: Use of differential scanning calorimetry heat profiles and mass spectrometry for the characterization and monitoring of lung cancer
6. Schneider, G., Kaliappan, A., Brock, G.N., **Garbett, N.C.***: Plasma thermograms as a novel serological biomarker in the characterization of frailty
7. Garbett, N.C., Kaliappan, A., Hall, M.B., Smolenkov, A.S., Wilkey, D., Riley, E., Merchant, M.L., Brock, G.N.: Plasma thermograms and mass spectrometry analysis of patient plasma samples for early detection of metastatic breast cancer
8. Hatch, M.B., Kaliappan, A., Hall, M.B., Harper, A., Metzinger, D., Parker, L., Brock, G.N., **Garbett, N.C.***: Calorimetric analysis of blood plasma and ascites as a novel approach for detection of ovarian cancer
9. **Garbett, N.C.***, Fish, D.J., Mekmaysy, C.S., and Chaires, J.B.: Plasma thermograms for diagnosis and therapeutic monitoring (in preparation).
10. **Garbett, N.C.***, Quinn, C., Kaliappan, A., DeLeeuw, L., and Chaires, J.B.: Fluorescence thermal shift assay and enthalpy screen method for the assessment of biomolecule-drug interactions (in preparation).
11. Kwon, A.M., Ren, D., Fish, D.J., and **Garbett, N.C.***: Approximated enthalpy approach from DSC for screening of cervical disease (in preparation).
12. Ball, W.J., **Garbett, N.C.**, Tabet, M.R., Tabaja, N. and Norman, A.B.: A re-engineered humanized anti-cocaine monoclonal antibody (h2E2): analysis of its thermo- and pH-stability and the energetics of ligand binding (in preparation).