Michael L. Metzker

(last updated February 22, 2024)

I. General Biographical Information

a. Personal:

Home address:	12015 Surrey Lane, Houston, TX 77024
Date of birth:	September 20, 1962
Citizenship:	United States

b. Education:

1984	University of California — Davis, Davis, CA B.S. — Biochemistry & Biophysics
1996	Baylor College of Medicine, Houston, TX Ph.D. — Molecular & Human Genetics

c. Academic Appointments:

2014-to-2019	Adjunct Associate Professor, Department of Molecular & Human Genetics & Human Genome Sequencing Center, Baylor College of Medicine, Houston, TX
2009-to-2019	Adjunct Associate Professor, Department of Chemistry, Rice University, Houston, TX
2009-to-2014	Associate Professor, Department of Molecular & Human Genetics & Human Genome Sequencing Center, Baylor College of Medicine, Houston, TX
2009-to-2014	Adjunct Associate Professor, Cell & Molecular Biology, Baylor College of Medicine, Houston, TX
2001-to-2008	Adjunct Assistant Professor, Department of Chemistry, Rice University, Houston, TX
2000-to-2008	Adjunct Assistant Professor, Cell & Molecular Biology, Baylor College of Medicine, Houston, TX
1999-to-2008	Assistant Professor, Department of Molecular & Human Genetics & Human Genome Sequencing Center, Baylor College of Medicine, Houston, TX

d. Corporate positions and other professional experiences:

2013-to-Present	Founder, President & CEO, RedVault Biosciences, Houston TX
2022-to-2023	Co-founder & CTO, 454 Bio, Inc.
2012	Founder, CTO, LaserGen, Inc.
2010	Consulted with Law & Order SVU on the episode, *The Quickie*
2009	Appeared on ABC's *20/20* profiling Collin Co. HIV criminal case
2009	Collin Co. work appeared on *Oprah*
2007-to-2009	Expert witness for HIV criminal case, Collins Co., TX
2004	Expert witness for HIV criminal case, Thurston Co., WA
2003	Appeared on *truTV*'s series *Forensics Files* in episode #152, "Shot of Vengeance"

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2002-to-2012	Founder, President & CEO, LaserGen, Inc., Houston TX
1997-to-1999	Expert witness for HIV criminal case, Lafayette, LA
1996-to-1999	Senior Research Biologist, Merck Research Laboratories, West Point, PA
1987-to-1991	Associate Scientist, Applied Biosystems, Inc. (ABI), Foster City, CA
1984-to-1987	Research Chemist, Bio-Rad Laboratories; Richmond, CA
1983-to-1984	Laboratory Technician, Aerojet-General Corporation; Sacramento, CA

e. Prior Expert Experience

In the past five years, I have provided expert testimony at a Markman hearing, trial or deposition in the following cases:

- 10X Genomics *v*. Bio-Rad Laboratories, Inc., Investigation no. 337-TA-1100 (on behalf of Bio-Rad Laboratories, Inc.)
- Plexxikon, Inc. *v*. Novartis Pharmaceuticals Corp., 4:17-cv-04405-HSG (EDL; on behalf of Plexxikon, Inc.)
- Guardant Health, Inc. *v*. Foundation Medicine, Inc. CA No. 17-1616 (LPS) (CJB, on behalf of Foundation Medicine, Inc.)
- ArcherDx, Inc. *v*. Qiagen Inc. CA 18-cv-01019-MN-CJB (on behalf of Qiagen)
- Illumina, Inc. *v*. Natera, Inc. CA 3:18-cv-1662-SI (on behalf of Natera)
- Illumina, Inc *v*. Complete Genomics, Inc. Case No. 20-cv-1465 (on behalf of Complete Genomics)
- Complete Genomics, Inc. *v*. Illumina, Inc & Illumina Cambridge, LTD. Case No. 19-970-MN (on behalf of Complete Genomics)
- Pillar Biosciences, Inc. *v*. Swift Biosciences, Inc. Case No. IPR2021-00401 (on behalf of Swift Biosciences)
- Ravgen, Inc. *v*. Ariosa Diagnostics, Inc.; Roche Sequencing Solutions, Inc.; Roche Molecular Systems, Inc. (collectively "Roche") Case No. 20-cv-1646 (on behalf of Roche)
- Illumina Cambridge Limited and Illumina Singapore Pte Limited ("Illumina") v. Comercial Rafer, S.L. and MGI Latvia Tech, SIA ("MGI"), Commercial Court of Barcelona, Spain, matter 249.1.4 1249/2020-3 (on behalf of MGI)
- Guardant Health, Inc. *v*. Natera, Inc., Case No. 3:21-cv-04062 (on behalf of Natera)
- DNA Genotek, Inc. v. Spectrum Solutions, Case No. 21-cv-0516 (on behalf of DNA Genotek
- Twinstrand Biosciences, Inc v. Guardant Health, Inc.., Case No. 1:21-cv-01126 (on behalf of Twinstrand Biosciences)
- The Trustees of the University of Pennsylvania and Regenxbio, Inc. v. Sarepta Therapeutics and Sarepta Therapeutics Three, Inc, Case No. 20-1226 (on behalf of The Trustees of the University of Pennsylvania and Regenxbio, Inc)
- Spectrum Solutions v. DNA Genotek, Inc., *Inter Partes* Review IPR2022-01347 (on behalf of DNA Genotek

- Invitae Corp. v. Natera, Inc.; Case No. 1:21-cv-006699-LPS and 1:21-cv-01635-LPS, (on behalf of Natera); US District Court, District of Delaware
- Natera, Inc., v. Neogenomics Laboratories, Inc., Case No. 1:23-cv-629 (on behalf of Natera)

II. Research Information

a. Research Support

1 — Current research support:

Technical description: RedVault proposes development of a low cost, rapid, and accurate POC assay for the detection of chlamydia and gonorrhea that could facilitate early detection, thus potentially reducing transmission and sequelae as well as improve therapeutic outcomes in the clinic.
Funding agency: CDC
Investigator relationship: PI: Michael Metzker
Date of funding: 09/30/2023– 09/29/2024
Annual costs: $299,928
Grant: 1R43PS005272-01-00, titled, "POC detection of chlamydia and gonorrhea small RNAs using a target reporter construct assay by lateral flow in urine surrogates."

2 — Completed research support:

Technical description: RedVault proposed the study and sequencing of genomes that has led to amazing discoveries in forensics, history, and medicine. Previous methods associated with preparing a DNA sample for sequencing depend on computationally reconstructing small pieces of data to understand genomic structure and variations, which is time intensive, error prone, and not accurate enough for large scale genomic information. The research proposed here is oriented toward significantly improving the methods of sample preparation, which will lead to improved efficiency, accuracy, and reduced costs to sequence DNA, thereby making the technology more accessible to more people.
Funding agency: NIH/NCI
Investigator relationship: PI: Michael Metzker
Date of funding: 02/01/2019 – 04/31/2023
Annual costs: $224,998
Grant: R43 CA232896-01A1, titled "Solid-phase replication of long template libraries for next-generation sequencing"

Technical description: RedVault Biosciences' proposes an innovative approach to reliably interrogate plasma specimens for clinically relevant miRNAs. Successful development of this technology may deliver a fundamental advancement in the cancer screening, tumor surveillance, and miRNA research fields.
Funding agency: NIH/NCI
Investigator relationship: PI: Michael Metzker
Date of funding: 06/07/2016 – 03/06/2018
Annual costs: $199,859
Grant: R43 CA200398-01A1, titled, "Digital Analysis of Plasma miRNA populations in Pancreatic Cancer."

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Technical description: RedVault Biosciences' proposal here is oriented toward significantly improving the methods of sample preparation, which will lead to improved efficiency, accuracy, and reduced costs to sequence DNA.
Funding agency: NIH/NCI
Investigator relationship: PI: Michael Metzker
Date of funding: 01/14/2016 – 02/13/2017
Annual costs: $146,801
Grant: R43 CA196134-01A1, titled, "Efficient Creation of Long-Template Libraries for Next-Generation Sequencing"

Technical description: The major goals of this project are to support sequencing and technology development in the areas of human genetics, cancer, the microbiome and comparative genomics.
Funding agency: NIH/NHGRI
Investigator relationship: Richard A. Gibbs; Co-Director Boerwinkle; co-PIs Muzny, Wheeler, Metzker, Worley
Date of funding: 11/01/2011 – 02/08/2015; effective end 02/08/14
Annual costs: $20,119,270
Grant: U54 HG003273-09, titled, "The Human Genome Sequencing Center"

Technical description: This proposal represents a request for continued funding of the Mayo Clinic Pharmacogenomics Research Network (PGRN) grant, "Pharmacogenetics of Phase II Drug Metabolizing Enzymes." The Mayo PGRN is an integrated, multidisciplinary, pharmacogenomic research effort that is based on a decades-long focus at Mayo on the pharmacogenetics of phase II (conjugating) drug metabolizing enzymes.
Funding agencies: NIGMS, NHLBI, NCI, NIDA, NICHD, NHGRI, NIMH, NIAMS, ORWH *Investigator relationship:* Richard Weinshilboum; Co-PIs Gibbs, Metzker, Scherer
Date of funding: 7/01/10 to 06/30/15; effective end 02/08/14
Annual costs: $425,709
Grant: 2U19GM061388-12, titled "Pharmacogenetics of Phase II Drug Metabolizing Enzymes"

Technical description: This proposal seeks to expand our existing scientific work on HIV forensic studies by developing a robust 'pathogen toolkit' for source identification across a range of biological agents
Funding agencies: National Institute of Justice
Investigator: Michael L. Metzker
Date of funding: 01/01/12 to 12/31/13
Annual costs: $341,017
Grant: 2011-DN-BX-K534 titled, "Extending the Microbial Forensic Toolkit Through Whole Genome Sequencing and Statistical Phylogenomics"

Technical description: This Phase I SBIR grant application proposes three aims: (*i*) identify the most efficient NGS platform by sequencing *E. coli* MG1655 using six platforms, (*ii*), conduct mixing experiments using purified gram negative and gram positive bacteria using the platform selected in aim (*i*), and (*iii*) conduct mixing experiments described in aim (*ii*) in the presence of human blood to simulate animal wound models.
Funding agency: Office of the Secretary of Defense, Defense Health Program
Investigator relationship: David Hertzog; co-PI Metzker

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Date of funding: 02/01/11 to 08/31/12
Annual costs: $150,000 *Total costs:* $150,000
Contract: W81XWH-12-C-0061, titled "Feasibility Study to Explore NGS Technologies in Pathogen Identification"

Technical description: The goal is to evaluate the feasibility of our next-generation, cyclic reversible termination (CRT) sequencing approach by targeting 1,000 candidate genes on highdensity oligonucleotide chips. *Funding agency:* NIH: NHGRI
Investigator: Michael L. Metzker
Date of funding: 08/01/08 to 05/31/11
Annual costs: $230,250 *Total costs:* $422,125
Grant: 1R21 HG004757, titled "Targeted CRT Sequencing of 1000 Genes in KPD Patients"

Technical description: The goal is to develop ultrafast sequencing-by-synthesis (SBS) technology that is practical on a genomic scale. *Funding agency:* NIH: NHGRI
Investigator: Michael L. Metzker
Date of funding: 10/01/04 to 09/30/08
Annual costs: $468,575 *Total costs:* $2,933,762
Grant: 1 R01 HG003573-01 titled, "Ultrafast SBS Method for large-Scale Human Resequencing"

Technical description: Development of a novel portable DNA sequencer for rapid identification of single nucleotide polymorphisms (SNPs) in common disease.
Funding agency: NIH: NHGRI
Investigator: Michael L. Metzker
Date of funding: 06/07/04 to 02/28/06
Annual costs: $421,914 *Total costs:* $532,761
Grant: 1 R41 HG003265-01 titled, "Development of a Portable PME DNA Sequencer"

Technical description: Development of novel FluoroBase dyes and associated nucleotide triphosphates, which have the potential to create sets of spectrally resolvable dye-terminators. *Special note:* Originally awarded to Michael L. Metzker as STTR application: Grant converted in SBIR
Funding agency: NIH:NHGRI
Investigator relationship: Vladislav A. Litosh; co-PI Metzker *Date of funding:* 07/11/03 to 12/31/05
Annual costs: $213,064 *Total direct costs:* $289,689
Grant: 1 R43 HG002632-01A1 titled, "Synthesis of FluoroBase Nucleotides for DNA Sequencing"

Technical description: The major goal of this project is to produce a draft sequence of the rhesus macaque and bovine genomes and extract maximal biological information from these data.
Funding agency: NIH: NHGRI
Investigator relationship: Richard A. Gibbs; co-Director Weinstock, co-PIs Muzny, Wheeler, Metzker, Worley
Date of funding: 11/10/03 to 10/31/06
Annual direct costs: $21,028,110 *Total direct costs:* $89,072,698
Grant: 1 U01 HG02051 titled, "Large Scale Sequencing at BCM-HGSC"

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Technical description: The goal of this project is to generate a draft sequence of the genome of *Bos Taurus*.
Funding agency: USDA
Investigator relationship: Richard A. Gibbs; co-Director Weinstock, co-PIs Muzny, Wheeler, Metzker, Worley
Date of funding: 12/01/03 to 11/31/05
Annual direct costs: $3,879,953 *Total direct costs:* $7,853,612
Grant: TEXR-2003-05478 titled, "Bovine Genome Sequencing Project (BGSP)"

Technical description: Development of a novel multi-color fluorescent detection apparatus with potential application for direct detection of targeted regions from genomic DNA materials.
Funding agency: NIH: NHGRI
Investigator: Michael L. Metzker
Date of funding: 04/01/03 to 03/31/05
Annual costs: $150,000 *Total costs:* $250,000
Grant: 1 R21 HG002443-01A2, titled "Development of Fluorescent Detector for DNA Sequencing"

Technical description: Development of a novel DNA sequencing strategy by synthesis for application in high-throughput single nucleotide polymorphism (SNP) analysis.
Funding agency: NIH: NHGRI
Investigator: Michael L. Metzker
Date of funding: 09/30/03 to 03/31/05
Annual costs: $310,504 *Total costs:* $436,400
Grant: 1 R41 HG003072-01 titled, "Screening *Taq* Pol I Variants using 3'-*O*-Modified-dNTPs"

Technical description: Pilot project to synthesize and characterize modified nucleoside for potential activity against HIV-1.
Funding agency: Robert A. Welch Foundation
Investigator: Michael L. Metzker
Date of funding: 06/01/01 to 07/31/04
Annual costs: $50,000 *Total costs:* $158,000
Grant: Q-1518 titled, "Characterization of HIV-1 drug resistance using 3'-saturated nucleotides"

Technical description: Development of sixteen spectrally-resolved dyes for high-throughput nucleic acid detection such as DNA sequencing.
Funding agency: NIH: NHGRI
Investigator relationship: Mathew Mahindaratne; co-PI Metzker – special note: Originally awarded to Michael L. Metzker as STTR application and then was converted in SBIR. *Date of funding:* 07/21/03 to 06/30/05
Annual direct costs: $214,000 *Total direct costs:* $214,000
Grant: 1 R43 HG002567-01A2 titled, "Development of Novel Fluorescent Dyes for DNA Sequencing"

Technical description: The major goal of this project is to determine the genome sequence of the rat.
Funding agency: NIH: NHGRI/NHLBI

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Investigator relationship: Richard A. Gibbs; co-Director Weinstock, co-PIs Muzny, Wheeler, Metzker, Worley
Date of funding: 02/27/01 to 02/26/04
Annual direct costs: $10,976,914 *Total direct costs:* $25,950,547
Grant: 1 U54 HG02345-02 titled, "Draft sequence of the rat genome"

Technical description: The major goal of this project is to prepare two types of extremely sensitive fluorescent label "cassettes" for DNA sequencing that may be used with both dye primer and dye terminator strategies. *Funding agency:* NIH: NHGRI
Investigator relationship: Kevin Burgess; co-PI Metzker
Date of funding: 09/06/01 to 07/31/05
Annual direct costs: $38,296 *Total direct costs:* $114,923
Grant: Competing Renewal FDN-S80093 titled, "Unnatural nucleotides for DNA sequencing"

Technical description: To develop and validate novel pooling-based methods for the rapid physical mapping of BAC libraries. *Funding agency:* NIH: NCRR
Investigator relationship: Aleksandar Milosavljevic; co-PI Metzker *Date of funding:* 09/30/02 to 08/31/05
Annual direct costs: $206,693 *Total direct costs:* $612,721
Grant: 1 U01 RR18464-01 titled, "Clone pooling methods for physical mapping"

Technical description: The major goals of this project are extensive mapping and sequencing of the mouse genome. *Funding agency:* NIH: NHGRI
Investigator relationship: Richard A. Gibbs; co-Director Weinstock, co-PIs Muzny, Wheeler, Metzker, Worley
Date of funding: 09/30/99 to 09/30/03
Annual direct costs: $5,316,551 *Total direct costs:* $20,851,198
Grant: 1 U54 HG02139 titled, "Network for large-scale sequencing of the mouse genome"

Technical description: To produce a draft sequence of *D. pseudoobscura* with annotation and finishing of selected full-length cDNA and gene-rich regions.
Funding agency: NIH: NHGRI
Investigator relationship: Richard A. Gibbs; co-Director Weinstock, co-PIs Richards, Muzny, Wheeler, Metzker, Worley
Date of funding: 05/10/02 to 04/30/03
Annual direct costs: $3,336,210 *Total direct costs:* $3,336,210
Grant: 1 U01HG02570 titled, "Sequencing, annotation and assembly of a second Drosophila"

b. National Scientific Participation

1 — Editorial/Advisory Boards:

2003-to-2006	*Genome Research*, Cold Spring Harbor Laboratory Press
2006-to-2012	*Advances in Genome Biology & Technology Meeting*, Scientific advisor
2007-to-present	*Milestones in DNA Technologies*, Nature, Scientific advisor
2011-to-2013	Genome Canada: Advancing Technology Innovation through Discovery (ATID) Advisory Committee

2 — Review panels:

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Feb 2024	Panel Chair: (SBIR) contract – Topic 108: Development of Rapid POC Diagnostics for Treponema pallidum (Phase II)
Jan 2022	Panel Chair: (SBIR) contract – Topic 108: Development of Rapid POC Diagnostics for Treponema pallidum (Phase I)
Nov 2019	NIH: ZRG1 SBIR/STTR/R21/R03: Infectious disease diagnostics, methods in sterilization & disinfection Study Section panels: IDM-V (12 & 19)
Jul 2019	NIH: ZRG1 SBIR: Biomaterials, Delivery, and Nanotechnology Study Section panel, ZRG1 BST-R (10)
May 2019	Chair, CIHR: Operating Grant CEEHRC (Epigenetics)
Feb 2019	Chair, CIHR: Operating Grant: Epigenetics Clinical Translation
Jan 2018	Invited expert on forensics, Arizona State University
Nov 2017	Chair, CEEHRC Phase II competition, Impact grants
Jul 2017	NASA Translational Research Institute Omics Panel
Mar 2017	CEEHRC Phase II: Platform Centres Renewal; Canadian Institutes of Health Research (CIHR)
Jun 2016	CIHR: Project Grant: Spring 2017 competition
Mar 2016	NIH: Sequencing Technology Special Emphasis Panel, ZHG1 HGR-N (M1)
Jan 2016	Disruptive Innovation in Genomics (DIG) Competition, Genome Canada
Jun 2015	Chair: CIHR's Team Grant: CEEHRC (Epigenetics)
May 2015	Genome Canada Genomics Innovation Network Technology Development International Review Committee
Mar 2015	National Center for Advancing Translational Sciences (NCATS), Special Emphasis Panel
Nov 2014	Genome Canada's Membership to the Genomics Innovation Network and Core Operations Support Funds competition
Oct 2014	Genomics, Computational Biology and Technology (GCAT) study section
Jun 2014	Interdisciplinary Molecular Science and Training – Cell, Molecular, and Computational Biology study section
Mar 2014	Genomics, Computational Biology and Technology (GCAT) study section; Transformative research award review
Feb 2014	ISD study section, Bioengineering Sciences and Technologies
Jan 2014	NASA study section: "Differential Effects on Homozygous Twin Astronauts Associated with Differences in Exposure to Spaceflight Factors"
Dec 2013	ISD study section, Bioengineering Sciences and Technologies
May 2013	Partnerships for Enhanced Engagement in Research (PEER) Health, NICHD
Apr 2013	Terry Fox New Frontiers Program in Cancer Research
Apr 2013	Science & Technology Innovation Centers' Renewal, Genome Canada
Jan 2013	Canada-Japan CEEHRC Teams in Epigenetics of Stem Cells, CIHR, Co-chair
Aug 2012	Chair: Team Grant: CEEHRC - LOI committee.
Feb 2012	Chair: Epigenomics platform peer review committee, Canadian Institutes of Health research (CIHR)
Feb 2012	Chair: Epigenetics catalyst peer review committee, CIHR

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Sep 2011	Ad hoc member of NIH Instrumentation and Systems Development (ISD) study section
Feb 2011	Science &Technology Innovation Center Competition Review: Genome Canada
Nov 2010	ATID Review: Genome Canada
Mar 2010	IDDRC P30 REVIEW, ZHD1-MRG-C (ID)
Oct 2009	Genomics, Computational Biology and technology study section, NIH
Jul 2009	DP3 Review, ZDK1 GRB-N(01), NIDDK
Jan 2009	Applied Genomics Research in Bioproducts or Crops (ABC), Genome Canada
Sep 2008	NCI Structural Biophysics Laboratory Site Visit, NCI
Nov 2007	Technology Development Competition, Genome Canada
2005-2007	Permanent member of NIH ISD study section
Apr 2007	Applied Emerging Technologies for Cancer Research, ZCA1 SRRB-4 (M1), NCI
Oct 2006	Applied Emerging Technologies for Cancer Research, ZCA1 SRRB-K (J1), NCI
Jun 2006	Innovative Technologies for the Molecular Analysis of Cancer, ZCA1 SRRBK (O1), NCI
Mar 2006	Applied Emerging Technologies for Cancer Research, ZCA1 SRRB-9 (M1), NCI
Oct 2005	ISD study section [ZRG1 ISD (01)], NIBIB
Oct 2005	Emerging Technologies for Cancer Research, ZCA1 SRRB-4 (J1), NCI
Jul 2005	ISD study section [ZRG1 ISD (01)], NIBIB
Jun 2005	Innovative Technologies for Cancer Research, ZCA1 SRRB-3 (O1), NCI
Mar 2005	ISD study section [ZRG1 ISD (01)], NIBIB
Mar 2005	Innovative Molecular Analysis Technology, ZCA1 SRRB-C (M2), NCI
Nov 2004	ISD study section, ZRG1 ISD (01), NIBIB
Jul 2004	Innovative Molecular Analysis Technology, ZCA1 SRRB-C (01), NCI
Jul 2004	ISD study section, ZRG1 ISD (01), NIBIB
Jun 2004	Subcommittee E – Cancer Epidemiology, Prevention & Control study section, NCI-E RPRB (X1), NCI
Mar 2004	ISD study section, ZRG1 ISD (01), NIBIB
Dec 2003	Genome Technology & Cytogenetics (GT&C) study section, ZRG1 GNM (90), NHGRI
Oct 2003	Atopic Dermatitis & Vaccinia Network; Clinical Studies Consortium study section [ZAI1 CL-1 (C1), NIAID
Jul 2003	GT&C study section, ZRG1 GNM (90), NHGRI
Nov 2001	Genome study section, CSR-GNM, NHGRI
Jul 2001	Center for Scientific Review – Special Emphasis Panel (CSR-SEP) study section [ZRG1 SSS-Y], NHGRI
Jul 2001	Bioengineering Research Partnership study section [ZRG1 SSS-Y (02)], NHGRI
Apr 2001	CSR-SEP study section [ZRG1 SSS-Y (11) B], NHGRI

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Mar 2001	Microbial Genome Project – study section, DOE
Nov 2000	CSR-SEP SBIR/STTR study section [ZRG1 SSS-Y (10)], NHGRI
Mar 2000	CSR-SEP SBIR/STTR study section [ZRG1 SSS-Y (01)], NHGRI
Nov 1999	CSR-SEP SBIR/STTR study section [ZRG1 SSS-Y (01)], NHGRI
Jul 1999	Technologies for Generation of Full-Length Mammalian cDNA study section [CA99-005], NCI
Jul 1999	CSR-SEP SBIR/STTR study section [ZRG1 SSS-Y (01)], NHGRI
Mar 1999	CSR-SEP SBIR/STTR study section [ZRG1 SSS-Y (01)], NHGRI
Mar 1998	SBIR/STTR Molecular Genetics study section [ZRG2 GNM O2B], NHGRI
Mar 1997	Biological & Physiological SEP study section [ZRG2 SSS-Y (15)], NHGRI

3 — Professional societies:

1996-to-present	American Association for the Advancement of Science
2000-to-present	American Chemical Society
2014-to-present	Texas Genetics Society

4 — Invited lectures, presentations, research seminars:

Apr 2016	Critical Path to TB Drug Regimens (CPRT) Workshop, Washington DC, Invited Speaker
May 2015	Advances in Next Generation Sequencing, Online, Keynote speaker
Mar 2013	ABRF- Satellite workshop, Palm Springs, CA; Invited Speaker
Jun 2012	American Society of Microbiology, San Francisco, CA; Invited Speaker
Jun 2012	Copenhagenomics, Copenhagen, Denmark, Invited Speaker
Feb 2012	Advances in Genome Biology & Technology, Marco Island, FL; Speaker
Apr 2011	Next-Gen Sequencing Conference, Boston, MA; Keynote Speaker
Apr 2011	Texas Association for Clinical Laboratory Science (TACLS), Austin, TX; Invited Speaker
Oct 2010	Centre de Regulació Genòmica (CRG) Symposium, Barcelona Spain, Invited Speaker
Jun 2010	ACS Meeting, San Diego, CA; Invited Speaker
May 2010	Next Generation Sequencing Workshop, Lübeck University, Germany; Invited Speaker
May 2010	Genomics Automation Conference, Boston, MA; Invited Speaker
Feb 2009	Advances in Genome Biology & Technology, Marco Island, FL Invited Speaker
Jun 2008	Workshop on Genotyping-Tissue Expression (GTEx) Resource, NIH Invited Participant
Oct 2007	International Conference on Genomics, Shenzhen, China; Invited Speaker
Sep 2007	IBC's Discovery-2-Diagnostics Conference, Philadelphia, PA Invited Chair & Speaker
Feb 2007	Advances in Genome Biology & Technology, Marco Island, FL

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	Invited Speaker
Oct 2006	International Conference on Genomics, Hangzhou, China Invited Speaker
Sep 2006	Genomics of Hyperglycaemia, Elsinore, Denmark Invited Speaker
Feb 2006	Advances in Genome Biology & Technology, Marco Island, FL Invited Speaker
May 2005	5th Annual RECOMB Satellite meeting on DNA Sequencing Technologies and Computation, Stanford University; Invited Speaker
Feb 2005	Advances in Genome Biology & Technology, Marco Island, FL Invited Speaker
Feb 2004	Advances in Genome Biology & Technology, Marco Island, FL Invited Speaker
Jun 2003	BECON 2003 Symposium on Catalyzing Team Science, NIH Invited Speaker
Jan 2002	Agriculture Program Research General Session, Texas A&M University Invited Speaker
Oct 2001	Genome sequencing and Analysis Conference XIII, San Diego, CA Invited Speaker
Feb 2001	Advances in Genome Biology & Technology, Marco Island, FL Invited Speaker
May 2000	Second Follow-Up Workshop on Priority Setting for Mouse Genomics and Genetics Resources, NIH; Invited Participant
Mar 1998	Full-Length cDNA Cloning: A Workshop on Problems and Solutions, The Banbury Center, Cold Spring Harbor; Invited Participant
May 1997	Workshop on Complete cDNA Sequencing, NIH; Invited Participant

c. Publications

1 — Peer-reviewed articles and reviews:

1. Burgess K, Gibbs RA, **Metzker ML**, and Raghavachari R (1994) Synthesis of an Oxyamide Linked Nucleotide Dimer and Incorporation into Antisense Oligonucleotide Sequences, ***J. Chem. Soc., Chem Commun***., 915-916.
2. **Metzker ML**, Raghavachari R, Richards S, Civitello A, Burgess K, and Gibbs RA (1994) Termination of DNA synthesis by novel 3'-modified-deoxyribonucleoside 5'-triphosphates, ***Nucleic Acids Res.*** 22, 4259-4267.
3. **Metzker ML**, Allain KM, and Gibbs RA (1995) Accurate determination of DNA in agarose gels using the novel algorithm *GelScann(1.0)*, ***Comput. Applic. Biosci.*** 11, 187-194.
4. **Metzker ML**, Lu J and Gibbs RA (1996) Electrophoretically Uniform Fluorescent Dyes for Automated DNA Sequencing, ***Science*** 271: 1420-1422.
5. Ansari-Lari MA, Liu XM, **Metzker ML**, Rut AR and Gibbs RA (1997) The extent of genetic variation in the CCR5 gene. ***Nature Genet.*** 16: 221-222.
6. Petrukhin K, Koisti MJ, Bakall B, Li W, Xie G, Marknell T, Sandgren O, Forsman K, Holmgren G, Andreasson, S Vujic, M Bergen AAB, McGarty-Dugan V, Figueroa D, Austin CP, **Metzker ML,** Caskey CT, and Wadelius C (1998) Identification of the gene responsible for Best macular dystrophy. ***Nature Genet.*** 19:241-247.

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7. **Metzker ML**, Ansari-Lari MA Liu XL, Holder DJ, and Gibbs RA (1998) Quantitation of MixedBase Populations of HIV-1 Variants by Automated DNA Sequencing with BODIPY DyeLabeled Primers. ***BioTechniques*** 25:446-462.
8. Hey PJ, Twells RCJ, Phillips MS, Nakagawa Y, Brown SD, Kawaguchi Y, Cox R, Xie G, Dugan V, Hammond H, **Metzker ML**, Todd JA, and Hess JF (1998) Cloning of a novel member of the low-density lipoprotein receptor family. ***Gene*** 216:103-111.
9. Brown SD, Twells RCJ, Hey PJ, Cox RD, Levy ER, Soderman AR, **Metzker ML**, Caskey CT, Todd JA, and Hess JF (1998) Isolation and characterization of *LRP6*, a novel member of the low density lipoprotein receptor gene family. ***Biochem. Biophys. Res. Commun***. 248:879-888.
10. **Metzker ML**, Raghavachari R, Burgess K, and Gibbs RA (1998) Elimination of residual natural nucleotides from 3'-*O*-modified-dNTP syntheses by enzymatic Mop-Up. ***BioTechniques*** 25:814-817.
11. Muzny DM, **Metzker ML**, Bouck J, Gorrell JH, Ding Y, Maxim E, and Gibbs RA (1998) Using BODIPY Dye-Primer Chemistry in Large-Scale Sequencing. ***IEEE Engineering in Medicine and Biology*** 88-93.
12. Allikmets R, Seddon JM, Bernstein PS, Hutchinson A, Sharma S, Gerrard B, Li W, **Metzker ML**, Wadelius C, Caskey CT, Dean M, and Petrukhin K (1999) Rare variants of the best disease gene in patients with age-related macular degeneration and other maculopathies. ***Hum. Genet*.** 104: 449-453.
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2. Gibbs RA, Richards S, Civitello A, Burgess K, Raghavachari R, **Metzker ML** (1993) PCT Application No. WO 93/05183. Method and device for rapid DNA or RNA sequencing determination by a base addition sequencing scheme; filed Sep 9, 1991.
3. Cathcart GR, Breenan-Marquez T, Bridgham JA, Golda G, Guiremand HA, Hane M, Hoff LB, Lachenmeier E, Kronick MN, Keith DH, Mayrand PE, **Metzker ML**, Mordan WJ, McBride LJ, Shigeura J, Ting CH, and Whiteley NM (1995) US Patent 5,443,791. Automated molecular biology laboratory.
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10. Petrukhin, K, Caskey, CT, **Metzker, ML**, Wadelius, C (1999) PCT Application No. WO 99/43695. Best's Macular Dystrophy gene; filed Feb 22, 1999.
11. Petrukhin K, Caskey CT, Li W, **Metzker ML** (2000) PCT Application No. WO 00/61606. Novel human voltage-gated potassium channel; filed Apr 14, 1999.
12. Liu XL, Bai C and **Metzker ML** (2001) PCT Application No. WO 01/42434. DNA molecules encoding human NHL a DNA helicase; filed Dec 9, 1999.
13. Todd JA, Twells RCJ, Hess JW, Hey P, Caskey CT, Hammond H, **Metzker ML** (2001) PCT Application No. WO 01/29213. Human Sit4 associated proteins like (SAPL) proteins and encoding genes; uses therefo.
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17. Scott GBI, Kittrell C, Curl RF, and **Metzker ML** (2003) PCT Application No. WO 03/021212. Pulsed-multiline excitation for color-blind fluorescence detection; filed Aug 28, 2002.
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19. Scott GBI, Kittrell C, Curl RF, and **Metzker ML** (2006) US Patent 6,995,841. Pulsed-multiline excitation for color-blind fluorescence detection.
20. Petrukhin K, Caskey CT, **Metzker ML**, Wadelius C (2006) US Patent 7,005,290. Best's Macular Dystrophy gene.
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22. Petrukhin K, Caskey CT, Li W, **Metzker ML** (2006) European Patent EP 1 173 465 B1. Novel human voltage-gated potassium channel.

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24. Todd JA, Hess JW, Caskey CT, Cox RD, Gerhold D, Hammond H, Hey P, Kawaguchi Y, Merriman TR, **Metzker ML**, Nakagawa Y, Phillips MS, Twells RCJ (2007) European Patent EP 0 988 379 B1. LDL-receptor.
25. Wu W, Litosh V, Stupi B, **Metzker ML**. (2008) PCT Application No. US2008/070749. Photocleavable labeled nucleotides and nucleosides and methods for their use in DNA sequencing; filed: Dec 5, 2007.
26. Liu XL, Bai C and **Metzker ML** (2008) US Patent 7,361,491. DNA molecules encoding human NHL a DNA helicase.
27. Scott GBI, Kittrell C, Curl RF, and **Metzker ML** (2009) US Patent 7,511,811. Pulsed-multiline excitation for color-blind fluorescence detection.
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30. Wu W, Litosh V, Stupi B, **Metzker ML**. (2011) US Patent 7,897,737. 3'OH unblocked nucleotides and nucleosides, base modified with photocleavable, terminating groups and methods for their use in DNA sequencing.
31. Wu W, Litosh V, Stupi B, **Metzker ML**. (2011) US Patent 7,964,352. 3'OH unblocked nucleotides and nucleosides, base modified with photocleavable, terminating groups and methods for their use in DNA sequencing.
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33. Lafferty WM, Beechem J, Hongye S, **Metzker ML** (2011) PCT Application No. WO/2011/116120. Method and Apparatus for Addressable Flow Cells in Single Molecule Sequencing; filed March 16, 2011.
34. Scott GBI, Kittrell C, Curl RF, and **Metzker ML** (2012) US Patent 8,089,628. Pulsed-multiline excitation for color-blind fluorescence detection.
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36. Wu W, Litosh V, Stupi B, **Metzker ML**. (2012) US Patent 8,198,029. 3'OH unblocked nucleotides and nucleosides, base modified with non-cleavable, terminating groups and methods for their use in DNA sequencing.
37. Wu W, Litosh V, Stupi B, **Metzker ML**. (2013) US Patent 8,361,727. 3'OH unblocked nucleotides and nucleosides, base modified with photocleavable, terminating groups and methods for their use in DNA sequencing.
38. Litosh V, Stupi B, Hersh M, Wu W, **Metzker ML**. (2013) US Patent 8,497,360. Nucleotides and nucleosides and methods for their use in DNA sequencing.
39. Litosh V, Stupi B, Hersh M, Wu W, **Metzker ML**. (2014) US Patent 8,887,905. Nucleotides and nucleosides and methods for their use in DNA sequencing.

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41. Wu W, Litosh V, Stupi B, **Metzker ML**. (2013) US Patent 8,969,535. Photocleavable labeled nucleotides and nucleosides and methods for their use in DNA sequencing.
42. Stupi B, Li H, Wu W, Hersh MN, Hertzog D, Morris SE, **Metzker ML**. (2013) PCT Application No. 2013/040257. 5-methoxy 3'-OH Unblocked, fast photocleavable terminating nucleotides and methods for nucleic acid sequencing; filed September 13, 2012.
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44. **Metzker ML**, Weier CA (2015) PCT WO2015/157747. Systems and methods for clonal replication and amplification of nucleic acid molecules for genomic and therapeutic applications.
45. Stupi B, Li H, Wu W, Hersh MN, Hertzog D, Morris SE, **Metzker ML**. (2016) US Patent 9,399,798. 3'-OH unblocked, fast photocleavable terminating nucleotides and methods for nucleic acid sequencing; to be issued Jul 26, 2016.
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50. Stupi B, Li H, Wu W, Hersh MN, Hertzog D, Morris SE, **Metzker ML**. (2017) US Patent 9,689,035. 3'-OH unblocked, fast photocleavable terminating nucleotides and methods for nucleic acid sequencing.
51. Litosh V, Stupi B, Hersh M, Wu W, **Metzker ML**. (2017) European Patent 2 307 565 B1. Reversible nucleosides and nucleotides terminators and their use in DNA sequencing.
52. Stupi B, Li H, Wu W, Hersh MN, Hertzog D, Morris SE, **Metzker ML**. (2018) US Patent 10,041,115. 3'-OH unblocked, fast photocleavable terminating nucleotides and methods for nucleic acid sequencing.
53. Stupi B, Li H, Wu W, Hersh MN, Hertzog D, Morris SE, **Metzker ML**. (2020) European Patent EP 2 755 984 B1. 5-Methoxy. 3'-OH unblocked, fast photocleavable terminating nucleotides and methods for nucleic acid sequencing.
54. Stupi B, Li H, Wu W, Hersh MN, Hertzog D, Morris SE, **Metzker ML**. (2021) US Patent 11,001,886. 3'-OH unblocked, fast photocleavable terminating nucleotides and methods for nucleic acid sequencing.
55. **Metzker ML**, Weier CA (2021) European Patent EP 3 129 505 B1. Methods for clonal replication and amplification of nucleic acid molecules for genomic and therapeutic applications.

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57. **Metzker ML**, Weier CA (2022) U.S. Patent No. 11,299,769. Target reporter constructs and uses thereof.
58. **Metzker ML**, Weier CA (2022) U.S. Patent Application No. 17/702,152. Target reporter constructs and uses thereof, filed Mar 23, 2022.

III. Teaching Information:

a. Courses taught at BCM:

2000-to-2018	*Molecular Methods*: All first-year graduate students are required to take this course. Three lectures taught: *cDNA and Genomic Libraries*, *First-generation Sequencing and Genotyping*, and *Next-generation Sequencing.*
2001-to-2003	*Mammalian Genetics:* All first-year genetics student are required to take this class. One lecture taught: *Mammalian Genome Analysis*.

b. Graduate student training:

2008-to-2011	Major advisor for Diane Scaduto, graduated with PhD from CMB program
2007-to-2010	Thesis committee member for Rocio Benabentos, CMB program
2004-to-2006	Major advisor for Michele Sexton, graduated with MS degree from CMB program
2001-to-2007	Major advisor for Wade C. Haaland, graduated with PhD from CMB program
2001-to-2005	Thesis committee member for Teresa Venezia, graduated with PhD from CMB program

2001-to-2013 Qualifying examination reviewer for 1-2 Genetics & CMB students 2000-to-2013
First year student rotations (1-2 per year)

c. Post-doctoral training:

2001-to-2003	Mathew Mahindaratne, Ph.D., now at UT San Antonio
2003-to-2004	Ernest Lewis, Ph.D., now at Rice University
2003-to-2006	Ming Fa, Ph.D.

d. Minority undergraduate student internships:

Summer 2004	Lamin Bangura, now at Ross University Medical School in Dominica(Caribbean)
Summer 2005	Rosalie Bangura, now at BCM
2006-to-2007	Demetra Farley, now in graduate school at Southwestern Medical Center, Division of Basic Science Program- Cancer Biology training track (began 2007)
Summer 2006	Mindy Smith, now at Chicago Medical School of Rosalind Franklin University of Medicine and Science

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Summer 2006	Quincy Johnson, now at Texas A&M University Graduate School of Engineering (began 2007)
Summer 2007	Dionne Watson, student at Prairie View A&M University
Summer 2008	Nicholas Chambers, student at Prairie View A&M University
Summer 2009	Ogechi Nwaobia, student at University of Texas, Austin
Summer 2010	Brian Tenner, Southern Methodist University and Crist Cuffee, Virginia Polytechnic Institute and State University
2010-to-2013	Jesse Muniz, University of Texas at Brownsville graduate, B.S. Biology

e. Innovation Norway in Houston internships

Spring 2011	Liv Arnica Forberg Hovland, now Editorial Assistant/Senior Adviser for the Tax Directorate
Spring 2015	Stian A. Weiseth, Norwegian University of Life Sciences, Master of Science student in Innovation and Entrepreneurship
Spring 2015	Hanne Hansen, Bergen University College, Master of Science student in Innovation and Entrepreneurship
Spring 2016	Espen Svendsen, Bergen University College, Master of Science student in Innovation and Entrepreneurship
Spring 2016	Ingrid-Helen Liabø,, Norwegian University of Life Sciences, Master of Science student in Innovation and Entrepreneurship
Spring 2017	Axel William Nilsen, Norwegian University of Life Sciences, Master of Science student in Innovation and Entrepreneurship

f. Local lectures

Jun 2008	Repeat of DNA Day Celebration Lecture for high school students, organized by the Office of Diversity and Community Outreach's Office of Diversity and Community Outreach at BCM
Apr 2008	DNA Day Celebration Lecture for high school students, organized by the Office of Diversity and Community Outreach at BCM

IV. Service information:

Administrative assignment:

2002-to-2013	Member: BCM Patent and Copyright Committee
2007-to-2013	Member: HGSC New Faculty Search Committee

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