

Bruce Budowle, PhD  
Graduate School of Biomedical Sciences  
Center for Human ID  
Microbiology, Immunology & Genetics  
**Email:** Bruce.Budowle@unthsc.edu



## Area of Expertise

Forensic genetics traditionally has been dedicated to analysis of human DNA markers for identity purposes to support criminal and civil investigations. However, with the demands of stakeholders and advances in technologies and bioinformatics, there is a substantial expansion of the applications of forensic genetics (or, better yet, forensic genomics). In addition to identification of humans associated with crime, or missing persons due to mass disasters or other crimes, other areas of application include molecular autopsy and microbial forensics.

Our research group has an advanced forensic genomics program using cutting edge genomics and technologies to effectively bolster current forensic and biosecurity capabilities. Some areas of interest are: computational genomics and bioinformatics; mixture interpretation; development of genetic diagnostics and detection capabilities; identification of novel genetic markers for human identification; population genetics studies; human microbiome studies for identification purposes; molecular autopsy (i.e. pharmacogenetics); and molecular mechanisms for DNA repair. These research efforts support the government in achieving its missions of law enforcement, combatting terrorism, providing biosafety, and preserving national biosecurity, all for a healthier and safer society.

## Qualifications

PhD in Genetics, Virginia Tech

## Recent Publications

### **STRait Razor Online: An enhanced user interface to facilitate interpretation of MPS data**

King, J. L., Woerner, A. E., Mandape, S. N., Kapema, K. B., Moura-Neto, R. S., Silva, R. & Budowle, B., May 2021, In: Forensic Science International: Genetics. 52, 102463.

### **Reducing noise and stutter in short tandem repeat loci with unique molecular identifiers**

Woerner, A. E., Mandape, S., King, J. L., Muenzler, M., Crysap, B. & Budowle, B., Mar 2021, In: Forensic Science International: Genetics. 51, 102459.

### **A continuous statistical phasing framework for the analysis of forensic mitochondrial dna mixtures**

Smart, U., Cihlar, J. C., Mandape, S. N., Muenzler, M., King, J. L., Budowle, B. & Woerner, A. E., Feb 2021, In: Genes. 12, 2, p. 1-21 21 p., 128.

### **Genetic assessment reveals no population substructure and divergent regional and sex-specific histories in the Chachapoyas from northeast Peru**

Guevara, E. K., Palo, J. U., Översti, S., King, J. L., Seidel, M., Stoljarova, M., Wendt, F. R., Bus, M. M., Guengerich, A., Church, W. B., Guillén, S., Roewer, L., Budowle, B. & Sajantila, A., Dec 2020, In: PLoS ONE. 15, 12 December 2020, e0244497.

### **A standalone humanitarian DNA identification database system to increase identification of human remains of foreign nationals**

Budowle, B., Bus, M. M., Jossierand, M. A. & Peters, D. L., 1 Nov 2020, In: International journal of legal medicine. 134, 6, p. 2039-2044 6 p.

### **Population genetic study of a Peruvian population using human identification STRs**

Neyra Rivera, C. D., Delgado Ramos, E., Robles Mamani, C. S., Velasquez Reinoso, M. R. E., Caceres Rey, O. A. & Budowle, B., 1 Nov 2020, In: International journal of legal medicine. 134, 6, p. 2071-2073 3 p.

### **Are low LRs reliable?**

Buckleton, J. S., Pugh, S. N., Bright, J. A., Taylor, D. A., Curran, J. M., Kruijver, M., Gill, P., Budowle, B. & Cheng, K., Nov 2020, In: Forensic Science International: Genetics. 49, 102350.

**Developmental validation of a MPS workflow with a PCR-based short amplicon whole mitochondrial genome panel**

Cihlar, J. C., Amory, C., Lagacé, R., Roth, C., Parson, W. & Budowle, B., Nov 2020, In: Genes. 11, 11, p. 1-31 31 p., 1345.

**Distinguishing mitochondrial DNA and NUMT sequences amplified with the precision ID mtDNA whole genome panel**

Cihlar, J. C., Strobl, C., Lagacé, R., Muenzler, M., Parson, W. & Budowle, B., Nov 2020, In: Mitochondrion. 55, p. 122-133 12 p.

**Numt identification and removal with RtN!**

Woerner, A. E., Cihlar, J. C., Smart, U. & Budowle, B., 15 Oct 2020, In: Bioinformatics. 36, 20, p. 5115-5116 2 p.

## **Sponsored Projects**

**Addressing Quality and Quantity: The Role of DNA Repair and Whole Genome Amplification in Forensically Relevant Samples for Meredith Turnbough**

Budowle, B.

NIJ: National Institute of Justice

1/10/10 → 30/09/13

**Application for Funding to Support the National Missing and Unidentified Persons System (NamUs)**

Budowle, B. & Planz, J.

NIJ: National Institute of Justice

1/10/16 → 30/09/18

**Application for Funding to Support the National Missing and Unidentified Persons System (NamUs)**

Budowle, B. & Coble, M.

NIJ: National Institute of Justice

1/10/16 → 30/09/20

**A Sustainable Approach to High Confidence Metagenomics Analysis of Complex Samples**

Budowle, B. & Woerner, A.

Signature Science, LLC

30/05/17 → 7/05/18

**Better algorithms and chemistry for mixture interpretation**

Woerner, A. & Budowle, B.

NIJ: National Institute of Justice

1/01/19 → 31/12/20

**Comprehensive Training Program in Forensic DNA Interpretation and Statistics**

Planz, J. & Budowle, B.

NIJ: National Institute of Justice

1/10/10 → 31/12/13

**Deadwood Study**

Budowle, B.

City of Deadwood

1/07/14 → 31/12/14

**Development of a Mitochondrial Mixture Database and Interpretation Tool**

Budowle, B. & Woerner, A.

NIJ: National Institute of Justice

1/01/18 → 31/12/19

**Development of an Analytical Approach for a Robust Probability Model for LCN DNA Profile Interpretation - Doctoral Student, Pamela Marshall**

Budowle, B.

NIJ: National Institute of Justice

1/10/12 → 31/05/14

**Development of Referencing Sample DNA Profiling for Databases Using Next Generation Sequencing Technologies**

Budowle, B. & Ge, J.

NIJ: National Institute of Justice

1/10/12 → 31/12/14

**DNA Analysis of Sexual Assault Evidence**

Budowle, B.

Texas Dept of Public Safety

1/09/16 → 31/12/16

**DNA Analysis of Sexual Assault Evidence**

Budowle, B.

Texas Dept of Public Safety

1/01/17 → 31/12/20

**Enhanced Sample Preparation and Data Interpretation Strategies for Massively Parallel Sequencing for Human Identification in Missing Persons and DVI Casework**

Budowle, B.

Sam Houston State University

1/01/16 → 31/12/17

**Enhancing Mixture Interpretation with Highly Informative STRs**

Budowle, B.

NIJ: National Institute of Justice

1/01/16 → 30/06/18

**Establishing the Quantitative Basis for Sufficiency Thresholds and Metrics for Friction Ridge Pattern Detail Quality and the Foundation for a Standard**

Budowle, B.

Virginia Polytechnic Institute

1/10/09 → 30/09/11

**Eugene and Millicent Goldschmidt Graduate Student Award (For: Sarah Schmedes)**

Budowle, B.

American Society for Microbiology

1/09/14 → 31/08/15

**Evaluation and Implementation of High Throughput Second Generation Sequencing for Mitochondrial DNA Testing in Missing Persons and Forensic Casework at the UNT Center for Human Identification**

Budowle, B.

NIJ: National Institute of Justice

1/01/17 → 31/12/18

**Forensic Analysis and Expert Witness Services**

Budowle, B.

Travis County

22/11/16 → 30/09/17

**FY2018 Capacity Enhancement and Backlog Reduction Program**

Budowle, B.

NIJ: National Institute of Justice

1/01/19 → 31/12/20

**FY2018 Forensic DNA Laboratory Efficiency Improvement and Capacity Enhancement Program: Backlog Reduction of Missing Persons' Samples**

Budowle, B. & Coble, M.

NIJ: National Institute of Justice

1/01/19 → 31/12/20

**General Forensic Testing: Testing & Analysis Work**

Budowle, B. & Cihlar, J.

Life Technologies Corporation

26/08/14 → 31/12/20

**Genetic Identity Projects**

Budowle, B.

Promega Corporation

18/08/10 → 31/08/12

**Genomic Sequencing Bioinformatics Platform for Forensic Analysis**

Budowle, B.

Parabon NanoLabs, Inc.

26/09/16 → 25/09/18

**Human Microbiome Species and Genes for Human Identification**

Budowle, B. & Allen, M.

NIJ: National Institute of Justice

1/01/16 → 30/09/18

**Identity, Lineage and Phenotypic SNP Identification, Assay Development and Data Interpretation**

Budowle, B.

Central Intelligence Agency

12/07/10 → 31/12/12

**Improved Tools and Interpretation Guidelines for Examining Limited Low Copy Number DNA Obtained from Degraded Single Source Samples: Bones, Teeth, and Hair.**

Budowle, B. & Planz, J.

NIJ: National Institute of Justice

1/10/09 → 31/05/12

**Indel Study**

Budowle, B.

Life Technologies Corporation

18/10/10 → 1/04/11

**Microbial Forensics and Attribution for Biological Nonproliferation**

Budowle, B.

Duke University

5/12/18 → 31/12/19

**NIJ Budowle 09/18 OVW Office of Violence Against Women - \$187,860.00**

Budowle, B.

NIJ: National Institute of Justice

1/10/16 → 30/09/18

**NIJ Budowle 09/18 VOCA - Victim of Crimes Act \$1,000,000.00**

Budowle, B.

NIJ: National Institute of Justice  
1/10/16 → 30/09/18

**NIJ FY15 DNA Capacity Enhancement and Backlog Reduction Program**

Budowle, B. & Planz, J.  
NIJ: National Institute of Justice  
1/01/16 → 31/12/17

**NIJ FY15 Using DNA Technology to Identify the Missing**

Budowle, B. & Planz, J.  
NIJ: National Institute of Justice  
1/01/16 → 31/12/17

**NIJ FY16 DNA Capacity Enhancement and Backlog Reduction Program**

Budowle, B.  
NIJ: National Institute of Justice  
1/01/17 → 31/12/18

**NIJ FY17 DNA Capacity Enhancement and Backlog Reduction Program**

Budowle, B.  
NIJ: National Institute of Justice  
1/01/18 → 31/12/19

**Novel Collection Device for Enhanced DNA Recovery and Release from Biological Stain Samples**

Budowle, B.  
NIJ: National Institute of Justice  
1/01/15 → 30/09/17

**Proteos**

Woerner, A. & Budowle, B.  
Signature Science, LLC  
2/07/18 → 1/07/19

**Reducing Human Trafficking Through Forensics in Central America**

Budowle, B. & Woerner, A.  
US Department of State Bureau of INL  
20/09/17 → 20/09/18

**Reducing Human Trafficking Through Forensics in Central America**

Budowle, B. & Coble, M.  
US Department of State Bureau of INL  
1/10/19 → 30/09/20

**Statement of Work for Microbial Forensics Technical & Scientific Process Subject Matter Expert Support**

Budowle, B.  
Signature Science, LLC  
1/02/12 → 31/01/15

**Typing Highly Degraded DNA Using Circularized Molecules and Target Enrichment**

Budowle, B.  
NIJ: National Institute of Justice  
1/01/17 → 31/12/18

**Typing Highly Degraded DNA Using Circularized Molecules and Target Enrichment (For: Rachel Wiley)**

Budowle, B.  
NIJ: National Institute of Justice

1/08/17 → 31/07/19

**UNTHSC Proposal for the Management and Support of the National Missing and Unidentified Person System**

Budowle, B.

NIJ: National Institute of Justice

1/10/11 → 30/09/16

**UNTHSC Support to Solano Task 2**

Budowle, B.

Battelle Memorial Institute

15/04/11 → 29/02/12

**Validation of Rapid DNA Typing System**

Budowle, B.

Department of Defense

28/01/13 → 27/01/14