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DATE OF FIRST EMPLOYMENT AT UI: August 2006

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IMMIGRATION STATUS: Permanent resident (green card holder)

PROFESSIONAL PREPARATION:

2006 Ph.D (Chemistry), Univ. Southern Denmark, Odense, Denmark (supervisor: Jesper Wengel)
2004 M.Sc (Chemistry), Univ. Southern Denmark, Odense, Denmark (supervisor: Jesper Wengel)
2000 B.Sc (Chemistry), Univ. Southern Denmark, Odense, Denmark (supervisor: JJL Iversen, deceased)

EXPERIENCE:

2017- Professor, Dept. Chemistry, Univ. Idaho
2011-2017 Associate Professor, Dept. Chemistry, Univ. Idaho
2006-2011 Assistant Professor, Dept. Chemistry, Univ. Idaho

2018-2019 Special Assistant to the Provost's Office, Univ. Idaho
2013-2016 Affiliate Faculty, Dept. Biological Sciences, Univ. Idaho
2011-2014 Adjunct Faculty, Dept. Chemistry, Washington State University
2006-2013 Affiliate Faculty, Neuroscience Graduate Program, Univ. Idaho

2022- Subject matter expert on a litigation pertaining to DNA sequencing technology
2021 Subject matter expert on a litigation pertaining to nucleoside/nucleotide chemistry
2016-2020 Subject matter expert on two litigations pertaining to DNA sequencing technologies
2016-2017 Subject matter expert on a litigation pertaining to siRNA
2011-2015 Consultant for Minitube of America (now MOFA Global)
2011-2012 Consultant for ISIS Pharmaceuticals Inc (now Ionis Pharmaceuticals)

SCHOLARSHIP ACCOMPLISHMENTS:

Publications:
72 peer-reviewed articles and reviews (according to Google Scholar: >1,800 citations, h-index = 25 (underlined), i10-index = 54); eight patent applications (three issued); two book chapters; 36 published conference proceedings/abstracts; one published book review.

Peer Reviewed Journal Articles and Reviews:

[72] C. P. Shepard, R. G. Emehiser, S. Karmakar, and P. J. Hrdlicka*. Factors impacting Invader-mediated recognition of double-stranded DNA. *Molecules* **2023**, *28*, 127.

[71] R. G. Emehiser, K. Dhuri, C. P. Shepard, S. Karmakar, R. Bahal and P. J. Hrdlicka*. Serine-γPNA, Invader probes, and chimeras thereof: Three probe chemistries that enable sequence-unrestricted recognition of double-stranded DNA. *Org*. *Biomol*. *Chem*., **2022**, *20*, 8714-8724.

[70] S. P. Adhikari, S. Karmakar and P. J. Hrdlicka*. Nicked Invader probes: Multistranded and sequence-unrestricted recognition of double-stranded DNA. *Org*. *Biomol*. *Chem*., **2022**, *20*, 1019-1030 (**Cover article**).

[69] S. P. Adhikari, P. Vukelich, D. C. Guenther, S. Karmakar and P. J. Hrdlicka*. Recognition of double-stranded DNA using LNA-modified toehold Invader probes. *Org. Biomol. Chem.,* **2021**, *19*, 9276 – 9290.

[68] S. Sivapragasam, B. Stark, A. V. Albrecht, P. Mao, R. G. Emehiser, P. J. Hrdlicka, G. M.K. Poon, J. J. Wyrick*. CTCF binding modulates UV damage formation to promote mutation hotspots in melanoma. *EMBO J.,* **2021**, e107795.

[67] D. C. Guenther, R. G. Emehiser, A. Inskeep, S. Karmakar and P. J. Hrdlicka*. Impact of non-nucleotidic bulges on recognition of mixed-sequence dsDNA by pyrene-functionalized Invader probes. *Org. Biomol. Chem.,* **2020***, 18*, 4645-4655.

[**66**] R. G. Emehiser and P. J. Hrdlicka*. Chimeric γPNA-Invader probes: Using intercalator-functionalized oligonucleotides to enhance the DNA-targeting properties of γPNA, *Org*. *Biomol*. *Chem*., **2020**, *18*, 1359-1368 (**Cover article**).

[**65**] R. G. Emehiser, E. Hall, D. C. Guenther, S. Karmakar and P. J. Hrdlicka*. A head-to-head comparison of LNA, ^{MP}γPNA, Invader and INA probes targeting mixed-sequence double-stranded DNA, *Org*. *Biomol*. *Chem*., **2020**, *18*, 56-65 (**Cover article and "HOT article"**).

[64] S. P. Adhikari, R. G. Emehiser, S. Karmakar, and P. J. Hrdlicka*. Recognition of mixed-sequence DNA targets using spermine-modified Invader probes. *Org*. *Biomol*. *Chem*., **2019**, 17, 8795-8799 (**Cover article**).

[63] S. Karmakar, T. Horrocks, B. C. Gibbons, D. C. Guenther, R. Emehiser and P. J. Hrdlicka*. Synthesis and biophysical characterization of oligonucleotides modified with O2'-alkylated RNA monomers featuring substituted pyrene moieties. *Org*. *Biomol*. *Chem*., **2019**, *17*, 609-621.

[**62**] P. J. Hrdlicka* and S. Karmakar. 25 Years and still going strong: 2′-*O*-(Pyren-1-yl)methylribonucleotides - Versatile building blocks for applications in molecular biology, diagnostics and materials science. *Org*. *Biomol*. *Chem*., **2017**, *15*, 9760-9774.

[61] S. Karmakar, D. C. Guenther, B. C. Gibbons and P. J. Hrdlicka*. Recognition of mixed-sequence DNA using double-stranded probes with interstrand zipper arrangements of O2′-triphenylene- and coronene-functionalized RNA monomers. *Org*. *Biomol*. *Chem*., **2017**, *15*, 9362-9371.

[60] M. Kaura and P. J. Hrdlicka*. Efficient discrimination of single nucleotide polymorphisms (SNPs) using oligonucleotides modified with C5-pyrene-functionalized DNA and flanking Locked Nucleic Acid (LNA) monomers. *Chem*. *Asian J*., **2016**, *11*, 1366-1369.

[59] B. A. Anderson and P. J. Hrdlicka*. Merging two strategies for mixed-sequence recognition of double-stranded DNA: Pseudocomplementary Invader probes. *J*. *Org. Chem*., **2016**, *81*, 3335-3346.

[58] S. Geny, P. M. D Moreno, T. Krzywkowski, N. K. Andersen, A. J. Isse, A. M. El-Madani, C. Lou, Y. V. Pabon, O. Gissberg, B. A. Anderson, E. M. Zaghloul, R. Zain, P. J. Hrdlicka, P. T. Jørgensen, M. Nilsson, K. E. Lundin, E. B. Pedersen, J. Wengel, and C. I. E. Smith. Next generation bis-locked nucleic acids with stacking linker and 2'-glycylamino-LNA show enhanced invasion into supercoiled duplex DNA. *Nucleic Acids Res.*, **2016**, *44*, 2007-2019.

[57] D. G. Singleton, R. Hussain, G. Siligardi, P. Kumar, P. J. Hrdlicka, N. Berova and E. Stulz*. Increased duplex stabilization in porphyrin-LNA zipper arrays with structure dependent excitonic coupling. *Org*. *Biomol*. *Chem*., **2016**, *14*, 149-157.

[56] D. C. Guenther, S. Karmakar and P. J. Hrdlicka*. Bulged Invader probes: Activated duplexes for mixed-sequence dsDNA recognition with improved thermodynamic and kinetic profiles. *Chem. Commun*., **2015**, *51*, 15051-15054.

[55] B. A. Anderson, S. Karmakar and P. J. Hrdlicka*. Mixed-sequence recognition of double-stranded DNA using enzymatically stable phosphorothioate Invader probes. *Molecules*, **2015**, *20*, 13780-13793.

[54] B. A. Anderson and P. J. Hrdlicka*. Synthesis and characterization of oligodeoxyribonucleotides modified with 2′-thio-2′-deoxy-2′-*S*-(pyren-1-yl)methyluridine. *Bioorg. Med. Chem. Lett*., **2015**, 25, 3999-4004.

[53] D. C. Guenther, G. H. Anderson, S. Karmakar, B. A. Anderson, B. A. Didion, W. Guo, J. P. Verstegen and P. J. Hrdlicka*. Invader probes: Harnessing the energy of intercalation to facilitate recognition of chromosomal DNA for diagnostic applications. *Chem. Sci*., **2015**, *6*, 5006-5015.

[52] M. Kaura and P. J. Hrdlicka*. Locked Nucleic Acid (LNA) induced effect on hybridization and fluorescence properties of oligodeoxyribonucleotides modified with nucleobase-functionalized DNA monomers. *Org. Biomol. Chem*., **2015**, *13*, 7236-7247.

[51] B. A. Anderson, J. J. Onley and P. J. Hrdlicka*. Recognition of double-stranded DNA using energetically activated duplexes modified with N2′-pyrene-, perylene-, or coronene-functionalized 2′-*N*-methyl-2′-amino-DNA monomers. *J. Org. Chem*., **2015**, *80*, 5395-5406 (**Featured Article**).

[50] S. Karmakar, A. S. Madsen, D. C. Guenther, B. C. Gibbons and P. J. Hrdlicka*. Recognition of double-stranded DNA using energetically activated duplexes with interstrand zippers of 1-, 2- or 4-pyrenyl-functionalized O2'-alkylated RNA monomers. *Org. Biomol. Chem*., **2014**, *12*, 7758-7773.

[49] B-A. F. Kengne, S. Karmakar, M. Kaura, G. Corti, V. V. R. Sai, I. B. Niraula, A. Larin, J. Hall, D. Sowell, P. J. Hrdlicka, V. Dobrokhotov and D. N. McIlroy*. Self-assembled monolayers of thiols adsorbed on Au/ZnO-functionalized silica nanosprings: Photoelectron spectroscopy-analysis and detection of vaporized explosives. *ACS Appl. Mater. Interfaces*, **2014**, *6*, 13355-13366.

[48] D. C. Guenther, P. Kumar, B. A. Anderson and P. J. Hrdlicka*. C5-Amino acid functionalized LNA: Positively poised for antisense applications. *Chem. Commun*., **2014**, *50*, 9007-9009.

[47] M. Kaura, P. Kumar and P. J. Hrdlicka*. Synthesis, hybridization characteristics and fluorescence properties of oligonucleotides modified with nucleobase-functionalized LNA (Locked Nucleic Acid) adenosine and cytidine monomers. *J. Org. Chem*., **2014**, *79*, 6256-6268.

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[45] P. Kumar, B. Bharal, B. A. Anderson, D. C. Guenther, M. E. Østergaard, P. K. Sharma and P. J. Hrdlicka*. C5-Alkynyl functionalized α-L-LNA: Synthesis, thermal denaturation experiments and enzymatic stability. *J. Org. Chem*., **2014**, *79*, 5062-5073.

[44] P. Kumar, M. E. Østergaard, B. Bharal, B. A. Anderson, D. C. Guenther, M. Kaura, D. J. Raible, P. K. Sharma and P. J. Hrdlicka*. Synthesis and biophysical properties of C5-functionalized LNA (Locked Nucleic Acid). *J. Org. Chem*., **2014**, *79*, 5047-5061.

[43] N. K. Andersen, B. A. Anderson, J. Wengel and P. J. Hrdlicka*. Synthesis and characterization of oligodeoxyribonucleotides modified with 2′-amino-α-L-LNA adenine monomers – High-affinity targeting of single-stranded DNA. *J. Org. Chem*., **2013**, *78*, 12690-12702.

[42] S. Karmakar, D. C. Guenther and P. J. Hrdlicka*. Recognition of mixed-sequence DNA duplexes: Design guidelines for Invaders based on 2′-*O*-(pyren-1-yl)methyl-RNA monomers. *J. Org. Chem*., **2013**, *78*, 12040-12048.

[41] S. P. Sau, A. S. Madsen, P. Podbevsek, N. K. Andersen, T. S. Kumar, S. Andersen, R. L. Rathje, B. A. Anderson, D. C. Guenther, S. Karmakar, P. Kumar, J. Plavec, J. Wengel and P. J. Hrdlicka*. Identification and characterization of 2nd generation Invader LNAs for mixed-sequence recognition of double-stranded DNA. *J. Org. Chem*., **2013**, *78*, 9560-9570 (**Featured Article**).

[40] B. Denn, S. Karmakar, D. C. Guenther and P. J. Hrdlicka*. Sandwich assay for mixed-sequence recognition of double-stranded DNA: Invader-based detection of targets specific to food pathogens. *Chem. Commun*., **2013**, *49*, 9851-9853.

[39] B. A. Didion, S. Karmakar, D. C. Guenther, S. Sau, J. P. Verstegen and P. J. Hrdlicka*. Invaders: Recognition of double-stranded DNA using duplexes modified with interstrand zippers of 2′-*O*-(pyren-1-yl)methylribonucleotides. *ChemBioChem*, **2013**, *14*, 1534-1538.

[38] S. Karmakar and P. J. Hrdlicka*. DNA strands with alternating incorporations of LNA and 2′-*O*-(pyren-1-yl)methyluridine: SNP-discriminating RNA detection probes. *Chem. Sci*., **2013**, *4*, 3447-3454.

[37] M. Kaura, P. Kumar and P. J. Hrdlicka*. Synthesis and hybridization properties of oligonucleotides modified with 5-(1-aryl-1,2,3-triazol-4-yl)-2′-deoxyuridines. *Org. Biomol. Chem*., **2012**, *10*, 8575-8578 (**Hot Communication**).

[36] S. P. Sau, P. Kumar, P. K. Sharma and P. J. Hrdlicka*. Fluorescent Intercalator Displacement Replacement (FIDR) assay: Determination of relative thermodynamic and kinetic parameters in triplex formation - A case study using triplex-forming LNAs. *Nucleic Acids Res*., **2012**, *40*, e162.

[35] S. K. Rastogi,* C. M. Gibson, J. R. Branen, D. E. Aston, A. L. Branen and P. J. Hrdlicka*. DNA detection on lateral flow test strips: Enhanced signal sensitivity using LNA-conjugated gold nanoparticles. *Chem. Commun*, **2012**, *48*, 7714-7716 (**>50 citations**).

[34] G. Wang, M. R. Papasani, P. Cheguru, P. J. Hrdlicka and R. A. Hill*. Gold-peptide nanoconjugate cellular uptake is modulated by serum proteins. *Nanomedicine: NBM*, **2012**, *8*, 822-832.

[33] S. P. Sau and P. J. Hrdlicka*. C2′-Pyrene-functionalized triazole-linked DNA: Universal hybridization to DNA/RNA. *J. Org. Chem*., **2012**, *77*, 5-16 (**Cover article; >60 citations**).

[32] S. Karmakar, B. A. Anderson, R. L. Rathje, S. Andersen, T. Jensen, P. Nielsen and P. J. Hrdlicka*. High-affinity DNA-targeting using readily accessible mimics of N2′-functionalized 2′-amino-α-L-LNA. *J. Org. Chem*., **2011**, *76*, 7119-7131.

[31] P. Kumar, M. E. Østergaard and P. J. Hrdlicka*. Preparation of C5-functionalized Locked Nucleic Acids (LNAs). *Curr. Protocols Nucleic Acid Chem.*, **2011**, *44*, 4.43.1-4.43.22.

[30] M. E. Østergaard, P. Kumar, B. Baral, D. C. Guenther, B. A. Anderson, F. M. Ytreberg, L. Deobald, A. J. Paszczynski, P. K. Sharma and P. J. Hrdlicka*. C5-Functionalized DNA, LNA and alpha-L-LNA: Improved positional control of polarity-sensitive fluorophores facilitates improved SNP-typing. *Chem. Eur. J.*, **2011**, *17*, 3157-3165.

[29] M. E. Østergaard and P. J. Hrdlicka*. Pyrene-functionalized oligonucleotides and Locked Nucleic Acids (LNAs): Tools for fundamental research, diagnostics, and materials science. *Chem. Soc. Rev*., **2011**, *40*, 5771-5788 (**>230 citations**).

[28] V. V. R. Sai, D. Gangadean, I. Niraula, G. Corti, D. N. McIlroy, D. E. Aston, J. R. Branen and P. J. Hrdlicka*. Silica nanosprings coated with noble metal nanoparticles: Highly active SERS substrates. *J. Phys. Chem. C.*, **2011**, *115*, 453-459 (**>40 citations**).

[27] M. E. Østergaard, J. Maiti, B. R. Babu, J. Wengel and P. J. Hrdlicka*. Glowing LNA as nucleic acid detection probes – Nucleobase analogs and insights into probe design. *Bioorg. Med. Chem. Lett.*, **2010**, *20*, 7265-7268.

[26] R. N. Veedu,* H. R. Burri, P. Kumar, P. K. Sharma, P. J. Hrdlicka, B. Vester and J. Wengel. Polymerase-directed synthesis of C5-ethynyl Locked Nucleic Acids. *Bioorg. Med. Chem. Lett*, **2010**, *22*, 6565-6568.

[25] M. E. Østergaard, P. Cheguru, M. R. Papasani, R. A. Hill* and P. J. Hrdlicka*. Glowing LNA – Brightly fluorescent probes for detection of nucleic acids in cells. *J. Am. Chem. Soc*. **2010**, *132*, 14221-14228 (**>40 citations**).

[24] M. E. Østergaard, D. C. Guenther, P. Kumar, B. Baral, L. Deobald, A. J. Paszczynski, P. K. Sharma and P. J. Hrdlicka*. Pyrene-functionalized triazole-linked 2′-deoxyuridines - Probes for discrimination of single nucleotide polymorphisms (SNPs). *Chem*. *Commun*., **2010**, 4929-4931.

[23] S. P. Sau, T. S. Kumar and P. J. Hrdlicka*. Invader LNA – Efficient targeting of short DNA duplexes. *Org*. *Biomol*. *Chem*., **2010**, *8*, 2028-2036 (**>40 citations**).

[22] M. E. Østergaard, P. Kumar, B. Baral, D. J. Raible, T. S. Kumar, B. A. Anderson, D. C. Guenther, L. Deobald, A. J. Paszczynski, P. K. Sharma and P. J. Hrdlicka*. C5-Functionalized LNA: Unparalleled hybridization properties and enzymatic stability. *ChemBioChem*, **2009**, *10*, 2740-2743.

[21] S. P. Sau, P. Kumar, B. A. Anderson, M. E. Østergaard, L. Deobald, A. J. Paszczynski, P. K. Sharma and P. J. Hrdlicka*. Optimized DNA-targeting using triplex forming C5-alkynyl functionalized LNA. *Chem. Commun*, **2009**, 6756-6758.

[20] S. K. Rastogi, N. N. Mishra, M. E. Østergaard, E. Cameron, B. Finaloski, P. J. Hrdlicka and W. C. Maki*. Hybridization study of PNA-DNA in liquid-solid phase for biosensor application. *Anal. Lett.,* **2009**, *42*, 2485-2495.

[19] B. Baral, P. Kumar, B. A. Anderson, M. E. Østergaard. P. K. Sharma and P. J. Hrdlicka*. Optimized synthesis of [3-^{15}N]-labeled uridine phosphoramidites. *Tetrahedron Lett.*, **2009**, *50*, 5850-5852.

[18] T. S. Kumar, M. E. Østergaard, P. K. Sharma, P. Nielsen, J. Wengel and P. J. Hrdlicka*. Parallel RNA-strand recognition by 2′-amino-β-L-LNA. *Bioorg. Med. Chem. Lett.,* **2009**, *19*, 2396-2399.

[17] J. W. Rigoli, M. E. Østergaard, K. M. Canady, D. C. Guenther and P. J. Hrdlicka*. Selective deacylation of peracylated ribonucleosides. *Tetrahedron Lett*., **2009**, *50*, 1751-1753.

[16] T. S. Kumar, A. S. Madsen, M. E. Østergaard, S. P. Sau, J. Wengel and P. J. Hrdlicka*. Functionalized 2′-amino-α-L-LNA - Directed positioning of intercalators for DNA targeting. *J. Org*. *Chem*. **2009**, *74*, 1070-1081 (**>40 citations**).

[15] T. S. Kumar, P. Kumar, P. K. Sharma and P. J. Hrdlicka*. Optimized synthesis of LNA uracil nucleosides. *Tetrahedron Lett*., **2008**, *49*, 7168-7170.

[14] T. S. Kumar, A. S. Madsen, M. E. Østergaard, J. Wengel* and P. J. Hrdlicka*. Nucleic acid structural engineering using pyrene functionalized 2′-amino-α-L-LNA monomers and abasic sites. *J. Org*. *Chem*. **2008**, *73*, 7060-7066.

[13] B. Vester, A. M. Boel, S. Lobedanz, B. R. Babu, M. Raunkjær, D. Lindegaard, Raunak, P. J. Hrdlicka, T. Højland, P. K. Sharma, T. S. Kumar, P. Nielsen and J. Wengel*. Chemically modified oligonucleotides with retained RNaseH response. *Bioorg*. *Med*. *Chem*. *Lett*. **2008**, *18*, 2296-2300.

[12] T. Umemoto, P. J. Hrdlicka, B. R. Babu and J. Wengel*. Sensitive SNP dual-probe assays based on pyrene-functionalized 2′-amino-LNA: Lessons to be learned. *ChemBioChem*, **2007**, *8*, 2240-2248 (**>40 citations**).

[11] T. S. Kumar, J. Wengel and P. J. Hrdlicka*. 2′-*N*-(pyren-1-yl)acetyl-2′-amino-α-L-LNA: Synthesis and detection of single nucleotide mismatches in DNA and RNA targets. *ChemBioChem*, **2007**, *8*, 1122-1125. (>**50 citations**).

[10] A. S. Madsen, P. J. Hrdlicka, T. S. Kumar and J. Wengel*. Synthesis, nucleic acid hybridization properties and molecular modeling studies of conformationally restricted 3′-*O*,4′-*C*-methylene-linked α-L-ribonucleotides. *Carbohydr*. *Res*. **2006**, *341*, 1398-1407.

[9] T. S. Kumar, A. S. Madsen, J. Wengel and P. J. Hrdlicka*. Synthesis and hybridization studies of 2′-amino-α-L-LNA and a tetracyclic 'Locked LNA'. *J. Org*. *Chem*. **2006**, *71*, 4188-4201 (>**50 citations**).

[8] P. J. Hrdlicka, T. S. Kumar and J. Wengel*. Synthesis and thermal denaturation studies of conformationally restricted 3′-C-ethynyl-3′-*O*,4′-*C*-methyleneribonucleotides. *Eur*. *J*. *Org*. *Chem*. **2005**, 5184-5188.

[7] P. J. Hrdlicka, B. R. Babu, M. D. Sørensen, N. Harrit and J. Wengel*. Multilabeled pyrene-functionalized 2′-amino-LNA probes for nucleic acid detection in homogenous fluorescence assays. *J*. *Am*. *Chem*. *Soc*. **2005**, *127*, 13293-13299 (>**140 citations**).

[6] P. J. Hrdlicka, T. S. Kumar and J. Wengel*. Targeting of mixed sequence double-stranded DNA using pyrene-functionalized 2′-amino-α-L-LNA. *Chem*. *Commun*. **2005**, 4279-4281.

[5] B. R. Babu, P. J. Hrdlicka, C. J. McKenzie and J. Wengel*. Optimized DNA targeting using *N*,*N*-bis(2-pyridylmethyl)-β-alanyl 2′-Amino-LNA. *Chem. Commun*. **2005**, 1705-1707.

[4] P. J. Hrdlicka, N. K. Andersen, J. S. Jepsen, F. G. Hansen, K. F. Haselmann, C. Nielsen and J. Wengel*. Synthesis and biological evaluation of branched and conformationally restricted analogs of the anticancer compounds 3′-*C*-ethynyluridine (EUrd) and 3′-*C*-ethynylcytidine (ECyd). *Bioorg. Med. Chem*. **2005**, *13*, 2597-2621.

[3] P**.** J. Hrdlicka, J. S. Jepsen, C. Nielsen and J. Wengel*. Synthesis and biological evaluation of nucleobase-modified analogs of the anticancer compounds 3′-*C*-ethynyluridine (EUrd) and 3′-*C*-ethynylcytidine (ECyd). *Bioorg. Med. Chem*. **2005**, *13*, 1249-1260.

[2] P. J. Hrdlicka, B. R Babu, M. D. Sørensen and J. Wengel*. Interstrand communication between 2′-*N*-(pyren-1-yl)methyl-2′-amino LNA monomers in nucleic acid duplexes: Directional control and signaling of full complementarity. *Chem. Commun.* **2004**, 1478-1479 (**>50 citations**).

[1] P. J. Hrdlicka, A. B. Sørensen, B. R. Poulsen, G. J. G. Ruijter, J. Visser and J. J. L. Iversen*. Characterization of nerolidol biotransformation based on indirect on-line estimation of biomass concentration and physiological state in batch cultures of *Aspergillus niger*. *Biotechnol. Prog*. **2004**, *20*, 368-376.

Manuscripts Submitted for Review:

N/A

Refereed Book Chapters:

[BC2] P. J. Hrdlicka* and Michael E. Østergaard. Fluorophore-functionalized Locked Nucleic Acids (LNAs) in *DNA Conjugates and Sensors, RSC Biomolecular Science Series*, edited by K. R. Brown and T. Brown (RSC Publishing, 2012), Vol. 26, 1-33.

[BC1] D. Choi*, D. McIlroy, J. Nagler, E. Aston, P. J. Hrdlicka, K. Gustin, R. Hill, D. Stenkamp and J. Branen. 1-Dimensional silica structures and their applications to the biological sciences in *Nanomaterials for the Life Sciences, Nanostructured Oxides*, edited by C. Kumar (Wiley, 2009), Vol. 2, 83-108.

Patent Applications:

[**PA8**] B. Didion, P. J. Hrdlicka and J. P. Verstegen. Gender-specific identification of sperm cells and embryos using locked nucleic acids. 2013, PCT WO 2013103713A1.

[PA7] P. J. Hrdlicka. Embodiments of a probe and method for targeting nucleic acids. U.S. Patent No. 9,885,082 (**issued February 2018**).

[PA6] P. J. Hrdlicka and Sujay P. Sau. Universal DNA/RNA hybridization probes. Provisional patent application, Univ. Idaho, October 31, 2011.

[PA5] P. J. Hrdlicka. Embodiments of a probe and method for targeting nucleic acids. Provisional patent application, Univ. Idaho, September 30, 2011.

[PA4] P. J. Hrdlicka and S. Karmakar. Selective targeting of single-stranded DNA using intercalator-functionalized oligonucleotides for diagnostic and biotechnological applications. Provisional patent application, Univ. Idaho, July 19, 2011.

[PA3] P. J. Hrdlicka, P. Kumar and Michael E. Østergaard. Nucleobase-functionalized conformationally restricted nucleotides and oligonucleotides for targeting of nucleic acids. U.S. Patent No. 8,518,908 (**issued August 2013**. **Continuation issued on December 2014** as U.S. Patent No. 8,912,318).

[PA2] P. J. Hrdlicka, P. Kumar and Michael E. Østergaard. The use of oligonucleotides modified with conformationally restricted C5-functionalized pyrimidine nucleotide building blocks for targeting of nucleic acids. Provisional patent application, Univ. Idaho, Sep 4, 2009.

[PA1] P. J. Hrdlicka and P. Kumar, Synthesis and applications of C5-Functionalized Locked Nucleic Acid (LNA). Provisional patent application filed, Univ. Idaho, July 31, 2008.

License Agreement:
Technology for use in diagnostic assays in animal reproduction technology was licensed to an undisclosed US company. Agreement was executed in November 1st 2011 and terminated in January 2019.

Published Conference Proceedings/Abstracts:

[CP36] P. J. Hrdlicka, S. Adhikari, R. Emehiser, D. C. Guenther, and S. Karmakar. Detection of Mixed-Sequence dsDNA using Bulged Invader Probes. 14th Annual Meeting of the Oligonucleotide Therapeutics Society.

[CP35] P. J. Hrdlicka. Synthesis and biophysical properties of nucleobase-functionalized LNA (locked nucleic acid). 2014 247th American Chemical Society National Meeting (San Francisco, CA), CARB-38.

[CP34] P. J. Hrdlicka. Recognition of double-stranded DNA using energetically activated duplexes modified intercalator-functionalized nucleotides. 2014 69th Northwest Regional Meeting of the American Chemical Society (Missoula, MT), NORM-16.

[CP33] S. Andersen, B. A. Anderson, B. Denn, D. C. Guenther, S. Karmakar, R. L. Rathje, S. P. Sau and P. J. Hrdlicka. Invaders: Recognition of double-stranded DNA using energetically activated duplexes modified intercalator-functionalized nucleotides. 2014 247th American Chemical Society National Meeting (Dallas, TX), CARB-90.

[CP32] M. Kaura, P. Kumar and P. J. Hrdlicka. Synthesis and characterization of oligodeoxyribonucleotides modified with nucleobase-functionalized Locked Nucleic Acids (LNAs). 2014 247th American Chemical Society National Meeting (Dallas, TX), BIOL-94.

[CP31] S. Karmakar, B. A. Anderson, R. L. Rathje, S. Andersen and P. J. Hrdlicka. High-affinity DNA targeting using simplified mimics of N2'-intercalator-functionalized 2'-amino-α-L-LNA. 2012 67th Northwest Regional Meeting of the American Chemical Society (Boise, ID), NORM-231.

[CP30] P. J. Hrdlicka. Sequence-unrestricted targeting of double stranded DNA (dsDNA): How to 'unlock' the dsDNA-targeting potential of Invader LNAs. 2012 67th Northwest Regional Meeting of the American Chemical Society (Boise, ID), NORM-129.

[CP29] P. J. Hrdlicka. Nucleobase-functionalized Locked Nucleic Acids (LNAs): Optimized probes for nucleic acid targeting. 2012 Abstracts of Papers, 243rd ACS National Meeting (San Diego, CA), ORGN-328.

[CP28] P. J. Hrdlicka. Sequence-unrestricted targeting of double stranded DNA (dsDNA): How to 'unlock' the dsDNA-targeting potential of Invader LNAs. 2012 Abstracts of Papers, 243rd ACS National Meeting (San Diego, CA), CARB-55.

[CP27] D. C. Guenther, P. Kumar and P. J. Hrdlicka. C5-amino acid functionalized LNA: Synthesis, evaluation of biophysical properties, and potential for antisense therapeutics. 2012 Abstracts of Papers, 243rd ACS National Meeting (San Diego, CA), BIOL-152.

[CP26] D. C. Julien, A. Giri, M. Papasani, G. Murdoch, P. Hrdlicka and R. A. Hill. Anti-K-Ras siRNA to treat pancreatic cancer. Nanotech Conference & Expo 2010: An Interdisciplinary Integrative Forum on Nanotechnology, Biotechnology and Microtechnology (Anaheim, CA), 401-404.

[CP25] M. R. Papasani, D. Pokharel, A. Giri, V. V. R. Sai, P. Hrdlicka and R. A. Hill. Oligoethylene glycol mediates knockdown effect of small interfering RNAs conjugated goldnanoparticles. Nanotech Conference & Expo 2010: An Interdisciplinary Integrative Forum on Nanotechnology, Biotechnology and Microtechnology (Anaheim, CA), 358-360.

[CP24] G. Wang, M. R. Papasani, P. J. Hrdlicka and R. A. Hill. Role of serum proteins in the cellular uptake of gold-peptide nanoconjugates. Nanotech Conference & Expo 2010: An Interdisciplinary Integrative Forum on Nanotechnology, Biotechnology and Microtechnology (Anaheim, CA), 304-307 (featured on Nano Science and Technology Institute webpage January 2011).

[CP23] P. Cheguru, M. Ostergaard, M. R. Papasani, V. V. R. Sai, J. Wengel, P. J. Hrdlicka and R. A. Hill. Novel nanoprobes to detect mRNA in situ, directed against mouse pyruvate dehydrogenase. Nanotech Conference & Expo 2010: An Interdisciplinary Integrative Forum on Nanotechnology, Biotechnology and Microtechnology (Anaheim, CA), 300-303.

[CP22] V. V. R. Sai, D. Gangaden, I. Niraula, G. Corti, D. N. McIlroy, D. E. Aston, J. Branen and P. J. Hrdlicka. Characterization of Au and Ag nanoparticle coated silica nanosprings - toward SERS based diagnostic applications. Nanotech Conference & Expo 2010: An Interdisciplinary Integrative Forum on Nanotechnology, Biotechnology and Microtechnology (Anaheim, CA), 19-22.

[CP21] S. Gibbon, J.R Branen, M. Frederickson and P. J. Hrdlicka. Identification of important food pathogens using LNA (Locked Nucleic Acid) probes. 2010 Joint 65th Northwest and 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA), NWRM-207.

[CP20] V. V. R. Sai, D. Gangadean, I. Niraula, G. Corti, D. N. McIlroy, D. E. Aston, J. R. Branen and P. J. Hrdlicka. Au and Ag nanoparticle coated silica nanosprings: characterizarion of SERS-active materials and detection of DNA from biological threat agents. 2010 Joint 65th Northwest and 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA), NWRM-206.

[CP19] B. A. Anderson, S. Karmakar, S. S. Iversen, R. L. Rathje, S. P. Sau and P. J. Hrdlicka. DNA targeting using next-generation invader LNAs. 2010 Joint 65th Northwest and 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA), NWRM-53.

[CP18] S. P. Sau, S. S. Iversen, R. L. Rathje, B. A. Anderson, S. Karmakar, J. Onley, M. R. Papasani, R. A. Hill and P. J. Hrdlicka. Invader LNA - efficient targeting of iso-sequential double stranded DNA. 2010 Joint 65th Northwest and 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA), NWRM-52.

[CP17] M. E. Østergaard, P. Kumar, B. Baral, D. C. Guenther, F. M. Ytreberg and P. J. Hrdlicka. Pyrene-functionalized oligonucleotides as probes in nucleic acid diagnostics. 2010 Joint 65th Northwest and 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA), NWRM-51.

[CP16] M. E. Østergaard, S. P. Sau, P. Kumar, B. A. Anderson, B. Baral, D. C. Guenther, M. Kaura and P. J. Hrdlicka. Optimized nucleic acid targeting using C5-functionalized LNA (Locked Nucleic Acid). 2010 Joint 65th Northwest and 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA), NWRM-50.

[CP15] M. E. Østergaard, B. Baral and P. J. Hrdlicka. Discrimination of single nucleotide polymorphisms (SNPs) using brightly fluorescent C5-functionalized Locked Nucleic Acid (LNA) probes. 2010 Abstracts of Papers, 239th ACS National Meeting (San Francisco, CA), PHYS-671.

[CP14] M. E. Østergaard, S. P. Sau, P. Kumar, B. A. Anderson, B. Baral, D. C. Guenther and P. J. Hrdlicka. Optimized nucleic acid targeting using C5-functionalized LNA (Locked Nucleic Acid). 2010 Abstracts of Papers, 239th ACS National Meeting (San Francisco, CA), ORGN-429.

[CP13] S. P. Sau and P. J. Hrdlicka. Invader LNA: Efficient targeting of short double stranded DNA. 2010 Abstracts of Papers, 239th ACS National Meeting (San Francisco, CA), ORGN-323.

[CP12] B. A. Anderson, R. L. Rathje and P. J. Hrdlicka. DNA targeting using invader nucleic acids. 2010 Abstracts of Papers, 239th ACS National Meeting (San Francisco, CA), ORGN-305.

[CP11] S. Gibbon, M. E. Østergaard, J.R Branen and P. J. Hrdlicka. Identification of important food pathogens using LNA (Locked Nucleic Acid) probes. 2010 Abstracts of Papers, 239th ACS National Meeting (San Francisco, CA), AGFD-173.

[CP10] T. S. Kumar, A. S. Madsen, J. Wengel and P. J. Hrdlicka. N2′-Functionalized 2′-amino-alfa-L-LNA: A novel class of locked nucleic acids as emerging tools for nucleic acid therapeutics and diagnostics. 2008 Abstracts of papers, 235th ACS National Meeting (New Orleans, LA), CARB-009.

[CP9] M. E. Østergaard, J. Maity, J. Wengel and P. J. Hrdlicka. 2′-N-(Pyren-1-yl)carbonyl-2′-amino-LNA (locked nucleic acid): A versatile label for nucleic acid detection. 2008 Abstracts of papers, 235th ACS National Meeting (New Orleans, LA), BIOL-032.

[CP8] N. K. Andersen, J. Wengel and P. J. Hrdlicka. N2′-functionalized 2′-amino-α-L-LNA adenine derivatives - Efficient targeting of single stranded DNA. *Nucleosides Nucleotides Nucleic Acids* **2007**, *26*, 1415-1417.

[CP7] T. S. Kumar, J. Wengel and P. J. Hrdlicka. Pyrene-functionalized 2′-amino-α-L-LNA as potential diagnostic probes. *Nucleosides Nucleotides Nucleic Acids* **2007**, *26*, 1407-1409.

[CP6] T. S. Kumar, A. S. Madsen, J. Wengel and P. J. Hrdlicka. Synthesis and biophysical studies of N2′-functionalized 2′-amino-α-L-LNA. *Nucleosides Nucleotides Nucleic Acids* **2007**, *26*, 1403-1405.

[CP5] T. Umemoto, P. J. Hrdlicka, B. R. Babu and J. Wengel. Dual-probe system using pyrenylmethyl-modified amino-LNA for sensitive SNP genotyping in a homogeneous fluorescence assay. *Nucleosides Nucleotides Nucleic Acids* **2007**, *26*, 1261-1263.

[CP4] P. J. Hrdlicka, T. S. Kumar and J. Wengel. Synthesis of a 2′-amino-α-L-LNA-T phosphoramidite. *Nucleosides Nucleotides Nucleic Acids* **2005**, *24*, 1101-1104.

[CP3] P. J. Hrdlicka, J. S. Jepsen and J. Wengel. Synthesis and biological evaluation of conformationally restricted and nucleobase-modified analogs of the anticancer compound 3′-*C*-ethynylcytidine (ECyd). *Nucleosides Nucleotides Nucleic Acids* **2005**, *24*, 397-400.

[CP2] B. R. Babu, Raunak, M. D. Sørensen, P. J. Hrdlicka, S Trikha, A. K. Prasad, V. S. Parmar and J. Wengel. Novel nucleic acid architectures involving LNA (Locked Nucleic Acid) and pyrene residues – Results from an Indo-Danish collaboration. *Pure Appl. Chem.* **2005**, *77*, 319-326.

[CP1] P. J. Hrdlicka, B. R. Babu, M. D. Sørensen, N. Harrit and J. Wengel. Ångström-scale chemical engineering: Multilabeled 2′-amino-LNA probes for nucleic acid detection in homogenous fluorescence assays. In: *Collection Symposium Series* (M. Hocek, Ed.), *7 (Chemistry of Nucleic Acid Components)*, 27-28, Institute of Organic Chemistry and Biochemistry, Academy of Sciences of the Czech Republic, Prague **2005**.

Published Book Review:

[BR1] P. J. Hrdlicka. "Modified nucleosides in biochemistry, biotechnology and medicine" from Wiley, edited by Piet Herdewijn, *ChemBioChem,* **2009**, *10*, 378-379.

Presentations:
Delivered ~20 invited presentations, ~15 contributed talks and >25 posters at external venues, along with numerous internal contributions.

Invited Presentations:

2021: Post Fall High School (Post Falls, ID)

2020: Boise State University, Department of Chemistry (Boise, ID)

2017: Washington State University, School of Molecular Bioscience.

2016: University of Colorado (Denver, CO); University of Southern Denmark (Odense, Denmark); Idaho INBRE Research Conference (Moscow, ID).

2015: Alnylam Pharmaceuticals (Cambridge, MA); Gordon Conference on "Nucleosides, Nucleotides and Oligonucleotides" (Newport, RI); Alios BioPharma (South San Francisco, CA).

2014: Nucleic Acid Summit 2014 (San Diego, CA); 69th Northwest Regional Meeting of the American Chemical Society (Missoula, MT); 248th American Chemical Society Meeting (San Francisco, CA); Binghamton University (Binghamton, NY).

2012: 67th Northwest Regional Meeting of the American Chemical Society (Boise, ID); University at Albany (Albany, NY).

2011: University of Aarhus (Aarhus, Denmark); Carnegie Mellon University (Pittsburgh, PA); University of Copenhagen (Copenhagen, Denmark); Nucleic Acid Center Mini-symposium on "Nucleic Acid Chemical Biology" (Odense, Denmark).

2010: ISIS Pharmaceuticals (Carlsbad, CA); Minitube of America (Mt. Horeb, WI); Washington State University (Pullman, WA).

2008: University Southern Denmark (Odense, Denmark).

2007: Washington State University (Pullman, WA); Gordon Conference on "Nucleosides, Nucleotides and Oligonucleotides" (Newport, RI).

Contributed Talks:

2016: Eastern Washington University; University of Alaska, Fairbanks.

2014: 247th American Chemical Society National Meeting (Dallas, TX); Weber State University; Utah State University; Utah Valley University; Central Washington University; Brigham Young University (main campus); University of Utah; Brigham Young University (Idaho campus); Idaho State University.

2013: University of Montana; Eastern Washington University; Eastern Oregon University.

2012: 243th American Chemical Society National Meeting (San Diego, CA) – two presentations.

2010: 65th Northwest / 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA); 239th American Chemical Society Conference (San Francisco, CA).

2008: 235th American Chemical Society National Meeting (New Orleans, LA).

2007: AAAS Pacific Division, 88th Annual Meeting of the Pacific Division Meeting & 62nd Annual Meeting of the Northwest Region, American Chemical Society (Boise, ID); Gonzaga University.

Student Presentations:

2022: Idaho INBRE Research Conference (Moscow, ID) - student presented a poster.

2021: 17th Annual Meeting of the Oligonucleotide Therapeutics Society (virtual) – student presented a video poster; Idaho INBRE Research Conference (Moscow, ID) - student presented a poster.

2020: 16th Annual Meeting of the Oligonucleotide Therapeutic Society meeting (virtual) - student presented a video poster.

2018: 14th Annual Meeting of the Oligonucleotide Therapeutic Society meeting (Seattle, WA) - student presented a poster.

2016: Idaho INBRE Research Conference (Moscow, ID) - student presented a poster.

2015: Idaho INBRE Research Conference (Moscow, ID) - student presented a poster.

2014: 10th Annual Oligonucleotide Therapeutics Society Meeting (San Diego, CA) – student presented poster and received the 2014 Dr. Alan M. Gewirtz Memorial Scholarship; Idaho INBRE Research Conference (Boise, ID) - student presented a poster; Nucleic Acid Summit (San Diego, CA) – student gave presentation and presented poster; 56th Idaho Academy of Science Conference (Moscow, ID) – student gave presentation; 247th ACS National Meeting (Dallas, TX) – students presented two posters.

2013: Idaho INBRE Research Conference (Moscow, ID) - student presented a poster.

2012: XX International Round Table on Nucleosides Nucleotides and Nucleic Acids (Montreal, Quebec, Canada) - students presented two posters; Idaho INBRE Research Conference (Moscow, ID) - student presented a poster (3rd place poster competition, faculty/staff choice category); Drug and Diagnostic Development Conference (San Francisco, CA) – postdoc presented a poster; 67th Northwest Regional Meeting of the American Chemical Society (Boise, ID) - student delivered a contributed talk; American Chemical Society Conference (San Diego, CA) - student presented a poster.

2011: Idaho-INBRE Research Conference (Moscow, ID) - student presented a poster; TIDES – Oligonucleotide and Peptide: Research Technology and Product Development (Boston, MA) – PI presented a poster; NW Regional Conference of the Society for Developmental Biology, Friday Harbor Laboratories (San Juan Island, WA) - collaborators presented a poster.

2010: 6th Annual Oligonucleotide Therapeutics Society Meeting (Dana Point, CA) – PI presented two posters; Pacific Northwest Undergraduate Research Symposium on Organic Chemistry & Chemical Biology - students delivered a contributed talk and a poster (winner of poster award); Bio Nanotech Conference and Expo (Anaheim, CA) - students and collaborators gave four contributed talks; 65th Northwest / 22nd Rocky Mountain Regional Meeting of the American Chemical Society (Pullman, WA) - students presented three contributed talks and two posters; American Chemical Society Conference (San Francisco, CA) - students presented a contributed talk and three posters.

2009: Sigma XI, Annual Meeting and Student Research Conference (Houston, TX) - students presented two posters; Donald S. Matteson Symposium (Washington State University) - students presented two posters (winner of poster award); Idea Network for Biomedical Research Excellence (INBRE) Conference (Pocatello, ID) - student presented a poster (winner of poster award).

2008: Sigma XI, Annual Meeting and Student Research Conference (Washington, DC) - students presented a poster; 17th Regional Conference on Undergraduate Research of the Murdock College Science Research Program (University of Puget Sound) - student presented a poster; Idea Network for Biomedical Research Excellence (INBRE) Conference (Boise, ID) - student presented a poster; American Chemical Society Conference (New Orleans, LA) - student presented a poster.
2007: Sigma XI, Annual Meeting and Student Research Conference (Washington, DC) - students presented a poster.

2006: XVII International Round Table, "Nucleosides, Nucleotides and Nucleic Acids" (Berne, Switzerland). – students and collaborators presented five posters (winner of poster award).

Local PI and Student Presentations:

2023: College of Science 20th Anniversary Seminar (Moscow, ID) – PI delivered a presentation

2021: 17th College of Science Student Research Expo (Moscow, ID) – student presented a poster.

2020: Department of Chemistry – PI delivered a presentation on Covid-19; 16th College of Science Student Research Expo (Moscow, ID) – student presented a poster.

2019: 15th College of Science Student Research Expo (Moscow, ID) – students presented two posters.

2018: 14th College of Science Student Research Expo (Moscow, ID) – students presented three posters.

2017: Department of Physics – PI delivered a presentation; 13th College of Science Student Research Expo (Moscow, ID) – student presented a poster.

2016: UI Undergraduate Research Symposium – student presented a poster.

2014: 10th College of Science Student Research Expo (Moscow, ID) – student presented a poster.

2013: Annual College of Science Student Research Exposition - students presented two posters (winner of Sigma Xi Scientific Research Society Award).

2012: Annual College of Science Student Research Exposition - students presented two posters.

2010: Annual College of Science Student Research Exposition - students presented four posters; Dept. Chemistry – PI delivered an oral presentation; Dept. of Microbiology, Molecular Biology and Biochemistry – PI delivered an oral presentation.

2009: Annual College of Science Student Research Exposition - students presented five posters; External review board meeting (IBEST/COBRE center) – PI presented two posters; IBEST Center – PI delivered an oral presentation; Neuroscience REU Poster Presentations - students presented two posters; BANTech Center – PI delivered an oral presentation.

2008: Annual College of Science Student Research Exposition - students presented five posters; Neuroscience REU Poster Presentations - students presented a poster.

2007: BANTech Center – PI delivered an oral presentation; IBEST Center – PI delivered an oral presentation; CAMBR Center – PI delivered an oral presentation.

2006: BANTech Center – PI delivered an oral presentation.

Grants and Contracts Awarded
Involved in securing seven external grants (total >$2M) and several internal grants (>$140k). Received unrestricted gifts totaling ~$50k from a US company.

External Grants Awarded:

2014-2016 Murdock Charitable Trust. Acquisition of a 500 MHz Nuclear Magnetic Resonance spectrometer ($681,866). Role: co-PI (PI: RV Williams, Univ. Idaho)

2014 Higher Education Research Council, Idaho State Board of Education (IGEM-004). Acquisition of a fluorescence microscope to support development of DNA diagnostics for use in the animal reproduction industry ($81,100). Role: PI.

2013-2014 Higher Education Research Council, Idaho State Board of Education (IF14-012). Production of gender-sorted sperm for applications in the animal reproduction industry using the Invader technology ($50,000). Role: PI.

2012-2013 Higher Education Research Council, Idaho State Board of Education (IF13-001). Development of diagnostic kits for gender determination of animal embryos ($50,000). Role: PI.

2010-2014 Department of Defense, Office of Naval Research (N00014-10-1-0282): Functionalized nanospring mats for detection of explosive materials (total $899,616). Role: PI of UI subcontract (PD: V Dobrohoktov, W. Kentucky Univ.; co-PI: DR McIlroy, Univ. Idaho).

2010-2011 INBRE-WSU Spokane – Institute of Translational Health Sciences (ITHS) Collaborative Translational Seed Grant: Invader LNAs to treat autosomal dominant retinal dystrophies ($40,000). Role: co-PI (PI: DR Stenkamp, Univ. Idaho; co-PI: M Neitz, Univ. Washington).

2009-2013 National Institute of Health, EUREKA (Exceptional, Unconventional Research Enabling Knowledge Acceleration), NIGMS (R01GM088697): Invader LNAs as novel gene specific therapeutics ($523,940). Role: PI (co-PIs: RA Hill, MR Papasani, Univ. Idaho).

Internal Grants Awarded:

2023 INBRE Pilot Grant. Silencing of gene expression using chemically modified DNA-targeting oligonucleotides ($50,000 direct). Role PI.

2016 Replacement of an ABI Expedite 8909 DNA Synthesizer, FY2016 One-Time Lab/Scientific/Test Equipment Funding Request ($22,000). Role: PI.

2015 Idaho INBRE: Submit your manuscript ($10,000). Role: PI.

2011 Idaho INBRE Graduate Student Grant: Application to support Ms. Brooke Anderson (~$25.000).

2010 Idaho INBRE Graduate Student Grant: Application to support Ms. Brooke Anderson (~$25.000).

2010 Idaho INBRE Travel grant: Attendance to 6th annual meeting of the oligonucleotide therapeutics society ($1,500). Role: PI.

2008 Univ. Idaho Research Office and Research Council Seed Grant: Functionalized Locked Nucleic Acid probes in enzymatic bio-nanotransduction systems for ultrasensitive biological threat detection platforms ($9,000). Role: PI, co-PIs: AL Branen and JR Branen (Univ. Idaho).

2008 Univ. Idaho, IBEST Pilot Grant Program: Intercalator-modified nucleic acid probes for targeting of double stranded DNA ($19,400). Role: PI.

2007 Idaho NSF EPSCoR Research Infrastructure Improvement (RII) – Startup Augmentation: Synthesis of isotopically labeled nucleotide building blocks for characterization studies ($11,585). Role: PI.

2007 Idaho NSF EPSCoR Research Infrastructure Improvement (RII) – Instrumentation: Karl-Fischer titrator for water content determination in moisture-sensitive reactions ($8,000). Role: PI.

2007 Univ. of Idaho Research Office and Research Council Seed Grant: Easily accessible functionalized nucleic acids for targeting of dsDNA ($9,000). Role: PI.

2007 Univ. of Idaho EPSCoR Travel Grant: Travel to AAAS Pacific Division/ACS NW Regional Meeting ($900).

Funded participant on USDA CSREES Federal Appropriations proposals (PIs: DN McIlroy, DE Aston).

Funded member of BANTech Center, Univ. of Idaho (PD: DN McIlroy).

Gifts Received:

2012-2013 Unrestricted gifts ($50,000) from an undisclosed US company.

2012 Equipment donation (laminar flow hood, autoclave, thermal cyclers, incubators, -80 °C freezer, lyophilizer, microplate readers, centrifuges, etc) from Prof. Larry Branen (Univ. Idaho).

Honors and Awards:

2022 College of Science, Advisory Board Faculty Fellowship, Univ. Idaho

2013 Excellence in Research and Creative Activity Award, Univ. Idaho

2012 President's Inaugural Mid-Career Faculty Award, Univ. Idaho

2010 College of Science, Early Career Faculty Award, Univ. Idaho

TEACHING ACCOMPLISHMENTS:

Areas of Specialization: organic chemistry, medicinal chemistry, nucleic acid chemistry and biology.

Courses Taught and Developed

CHEM 277 Organic Chemistry I (Fall: 2009-2012, 2020-2022); 2010-2012 and 2021 classes averaged $58^{th}/65^{th}/60^{th}/38^{th}$ national percentile, respectively on standardized 1^{st} term ACS exams

CHEM 372 Organic Chemistry II (Spring: 2010, 2021-2023); 2010, 2022 and 2023 classes averaged $79^{th}/58^{th}/42^{nd}$ national percentile on standardized ACS exam

CHEM 414/514 Applications of Nanomaterials in Biomedical Engineering (team taught, ~15% effort: Spring 2007/2008/2009/2010 – formerly CHEM404/504)

CHEM 472/572 Introduction to Medicinal Chemistry (Spring: 2008-2009, 2011, 2013-2015, 2017-2020, 2022-2023).

CHEM 571 Recent developments in Nucleic Acid Chemistry (Fall 2017)

CHEM 571 Nucleic Acids: Synthesis and Applications (Fall 2008/Spring 2012)

CHEM 571 Survey of DNA Targeting Technologies (Fall: 2013, 2015, 2019)

CHEM 571 Introduction to Nucleic Acid Chemistry (Fall: 2014, 2016)

Other Teaching Contributions:

CHEM 112H Principles of Chemistry II" (Spring 2007; guest lecturer); CHEM 299 Undergraduate Research (supervisor); CHEM 376 Organic Chemistry Lab II (Spring 2008; guest lecturer); CHEM 491 Undergraduate Research (supervisor); CHEM 500 Master's Research and Thesis (supervisor); CHEM 501 Seminar (Spring 2007-Spring 2008, coordinator); CHEM 502 Synthetic Nucleic Acid Chemistry (Spring 2008, supervisor); CHEM 502 Comprehensive Exam Organic Chemistry (Spring 2008, coordinator); CHEM 502 Advanced Nucleic Acid Chemistry (Spring 2009/2010, directed study); CHEM 502 Nucleobase-functionalized LNA (Fall 2016, Fall 2021); CHEM 502 Nucleic Acid Seminar (Spring 2018); CHEM 502 Survey of Invader technology (Fall 2019, directed study); CHEM 504 Frontiers in Nucleic Acids (Fall 2018, Spring 2020 and every semester onwards; CHEM590: Doctoral Research Proposal (supervisor); CHEM 600 Doctoral Research and Dissertation (supervisor); MMBB 404 Summer Research Seminar - Research Topics and Professional Development (Summer 2008/2009/2010/2011, supervisor); NEUR 508 Topics in Neuroscience (Spring 2007; guest lecturer); setting and grading cumulative and comprehensive exams.

Students Advised:

Undergraduate Students:

28 students have been supervised on research projects since 2006. UI students: Ryan Costa [fall 2022-spring 2023], Peter Wieber [summer 2022-present], Ibrahim Al Janabi [2021-2022], Allison Rowley [2014-2016], Hannah Kiser [2014], Philip Vukelich [2013-2015], Max Cowan [2013], Benjamin Denn [2011-2013], Mason Frederickson [2009-2011], Matt Womeldorff [2010-2011], Mitchell Odom [2010], David Love [2009-2010], Seth Gibbon [2009], Jared Rigoli [2008], Dusty van Hofwegen [2008], Pramod Yallamanchilli [2008], Kirsten Canady [2007], Michael Chavez [2007] and Sarah Doornbos [2007]; Visiting students: Macie-Grace Guthrie [2016, Brigham Young University - Idaho], Bradley Gibbons [2013, Brigham Young University - Idaho], Grace Anderson [2012, Montana Tech. Univ.], Tyler Horrocks [2012, Brigham Young University - Idaho], Jared Onley [2009, Whitworth University], Laurant Palmatier [2009, Univ. California San Diego], Daniel Raible [2008, Whitworth University], Joanna Hawryluk [2007, Simmons College] and Johanna Root [2007, Univ. Puget Sound].

I typically supervise 3-5 non-research undergraduates at any given time on curriculum and career matters, and typically write 5-10 recommendation letters per year for undergraduates seeking admission in graduate, medical or other professional schools.

Graduate Students:

Advised to completion of degree as major professor:

Summer 2021, Shiva P. Adhikari, PhD in Chemistry: "Optimizing Invader Probe Architectures for Sequence-Unrestricted Recognition of dsDNA Targets". Current occupation: Senior Scientist, Therapeutic Process Development, LGC Genomics (Bioresearch Technologies Inc.)

Summer 2020, Raymond G. Emehiser, PhD in Chemistry: "Exploring double-stranded DNA-targeting strategies". Current occupation: Senior Scientist, Abbott Laboratories (previous occupation: Scientist, Process Development, OliX).

Spring 2020, Caroline Shepard, MS in Chemistry: "Invader-mediated targeting of chromosomal DNA". Current occupation: Graduate student, University of Virginia Medical School.

Spring 2016, Eric Hall, MS in Chemistry (non-thesis option).
Current occupation: Graduate student, Idaho College of Osteopathic Medicine

Fall 2015, Dale C. Guenther, PhD in Chemistry: "Exploiting the Energy of Intercalation for Sequence-

Specific Recognition of Double-Stranded DNA". Current occupation: Senior scientist, research analytics, Alnylam Pharmaceuticals, Cambridge, MA (previous: postdoctoral fellow at Alnylam Pharmaceuticals).

Spring 2015, Brooke A. Anderson, PhD in Chemistry: "Synthesis and Characterization of Energetically Activated Duplexes for Sequence-Unrestricted Recognition of Double-Stranded DNA". Current occupation: Senior scientist, oligonucleotide chemistry, Ionis Pharmaceuticals (previous: postdoctoral fellow with Ram Krishnamurthy, Scripps Research Institute).

Fall 2014, Mamta Kaura, Ph.D in Chemistry: "Synthesis and Characterization of Nucleobase Functionalized Locked Nucleic Acids (LNAs): Chemical Modifications for Therapeutics and Diagnostic Purposes".
Current occupation: Associate Scientist, Oligo Process Development section of Nitto Denko Avecia.

Fall 2013, Saswata Karmakar, Ph.D in Chemistry: "Synthesis and Biophysical Characterization of O2'-Intercalator-Functionalized Oligonucleotides for Mixed-Sequence Recognition of Double-Stranded DNA". Current occupation: Associate Director of Chemistry at Translate Bio (previous: postdoctoral fellow with Eric T. Kool, Stanford University).

Fall 2011, Sujay P. Sau, Ph.D in Chemistry: "Chemically modified oligonucleotides for targeting of DNA and RNA". Current occupation: Scientist with Aurigene Pharmaceutical Services Lmt. (previous occupation: postdoctoral fellow with John Chaput, UC Irvine).

Fall 2010, Michael E Østergaard, PhD in Chemistry: "Functionalized Locked Nucleic Acid for Therapeutic and Diagnostic Purposes". Current occupation: Research Fellow with Ionis Pharmaceuticals.

Spring 2010, Bharat Baral, MS in Chemistry: "Part I: Biophysical Characterization of C5-Functionalized Locked Nucleic Acids and Part II: Optimized Synthesis of [3-15N]-Labeled Uridine Phosphoramidites". Current occupation: Scientist with Janssen Pharmaceuticals.

Spring 2008, Todd Pankratz, MS in Chemistry (non-thesis option).
Current occupation: Director of Operations, Mary's Medicinals.

Visiting graduate students advised to completion of degree (as formal external supervisor):
Summer 2009, Sanne Iversen, M.Sc in Chemistry: "Intercalator modified RNA nucleosides" (co-supervisor: P Nielsen, Univ. Southern Denmark). Current occupation: Health Safety and Environment (HSE) Specialist at MHI Vestas Offshore Wind (Denmark)

Summer 2009, Rie L. Rathje, M.Sc in Chemistry: "DNA-targeting using N2'-functionalized 2'-methylamino DNA" (co-supervisor: P Nielsen, Univ. Southern Denmark). Present occupation: unknown.

Current advising of graduate students as major professor:
Michaela Brown (summer 2019-).
Ashikur Md. Rahman (fall 2021-)
Timo Dohm (fall 2022-)

Graduate committee member:
Daniel Julien (MS, major professor: Rod Hill, spring 2010)
Pallavi Cheguru (Ph.D, major professor: Rod Hill, spring 2011)
Niels Bomholt (Ph.D, major professor: Erik B. Pedersen, Univ. Southern Denmark, summer 2011)
Parameswara Subramanian (MS, major professor: Aaron Thomas, fall 2011)
Andrew Markelonis (MS, major professor: Chien Wai, fall 2011)
GuanKui Wang (Ph.D, major professor: Rod Hill, summer 2012)
Jamie Haas (Ph.D, major professor: David McIlroy, fall 2012)
Temple C. Warwick (Ph.D, major professor: Tom Bitterwolf, spring 2013)
Hugo Arajo (MS, major professor: Jakob Magolan, spring 2014)
Ebeneezer Jones-Mensah (PhD, major professor: Jakob Magolan, spring 2016)
Charlotte Reslow-Jacobsen (Ph.D, major professor: Poul Nielsen, Univ. Southern Denmark, summer 2016)
Dusty van Hofwegen (Ph.D, major professor: Sam Minnich, Fall 2016)
Tulsi Damase (Ph.D, major professor: Peter Allen, Fall 2018)

Abdulakeem Osumah (Ph.D, major professor: Kris Waynant, Summer 2020)
Moubani Chakraborty (Ph.D, major professor: Kris Waynant, Summer 2022)

Andrew Aring (Ph.D, major professor: Richard Williams, abandoned)

Postdoctoral fellows:
V.V.R. Sai (Mar 2009-Mar 2011). Current occupation: Associate Prof. Indian Institute of Technology, Madras

Shiva Rastogi (Dec 2010-Sep 2012). Current occupation: Lecturer, Texas State University

Visiting scientists:
Jianqin Liu (July 2013-Aug 2013: scientist at Minitube of America, Mt. Horeb, WI, USA)
Pawan Kumar (Jan 2008-Jan 2009 and March 2010-July 2010: Ph.D. student, Kurukshetra University, India)
T. Santhosh Kumar (Sep 2007-Dec 2007: Ph.D. student, Univ. Southern Denmark, Denmark)

Honors and Awards:

2022 Donald Crawford Graduate Faculty Mentoring Award, Univ. Idaho

SERVICE:

Professional Memberships

2008-2015	Member, American Chemical Society, carbohydrate section
2010-2011, 2018	Member, Oligonucleotide Therapeutics Society
2010-2011	Member, Institute of Translational Health Sciences (ITHS)

Professional Service

Referee on ~155 manuscripts submitted to Chemical Communications; Journal of Organic Chemistry; Journal of the American Chemical Society; Nucleic Acids Research; ChemBioChem; Organic and Biomolecular Chemistry; Chemistry – European Journal; Chemical Science; Angewandte Chemie; etc.

Grant reviewer for National Science Foundation (NSF), Royal Society of Chemistry (UK), Czech Science Foundation, Biotechnology and Biological Science Research Council (UK), and Macquaire University (Australia). Pre-submission reviewer on NIH proposals from Univ. Nebraska.

Member of the Scientific Advisory Council of the Oligonucleotide Therapeutics Society (2013-present).

Member of the Scientific Advisory Board for OLIGOMED, an EU project (2021-present).

Guest Editor for special issue of the journal Chemosensors entitled “Nucleic Acid Probes” (2014-2015).

External reviewer, promotion and tenure committee, Colorado State University (2015) and Boise State University (2013).

Co-organizer, Medicinal Chemistry Section, ACS NORM-RMRM Meeting 2010.

Conducted and published book review for ChemBioChem (2009).

Committee Service:

University level:

2019-2020	Member, President Green's Sustainable Financial Model Working Group
2018-2019	Member, Promotion and Tenure Task Force (compensation)
2018	Member, University Finance Advisory Committee
2018	Member, PERSI/ORP workgroup
2018	Member, search committee, Manager for Faculty Operations

2017-2018	Member, search committee, Director for Confucius Institute
2017-2018	Member, 'Great Colleges to Work For' Cascading Plan workgroup
2017	Chair, nominating committee, Faculty Secretary search
2016-2017	Chair, Committee on Committees
2016-2018	Co-chair, Faculty Compensation Task Force
2016-2017	Member, University Budget and Finance Committee
2015-2018	Member, Faculty Senate (chair 2017-present; vice chair 2016-2017)
2015-2016	Member, Benefits Advisory Group
2015-2016	Member, Vandal Strategic Loan Fund Committee
2008-2011	Member, Faculty Affairs Committee

College level:

2022-	Member, COS Promotion and Tenure committee
2012-2014; 2015-2018	Member, Faculty and Staff Council
2012	Member, promotion committee (Animal Vet. Science)
2012	Member, search committee, interim and permanent Dean (College of Science)
2010	Faculty Marshal, commencement
2008-2011	Member, LeTourneau committee
Fall 2008	Member, 3rd year review committee (Dept. Physics)

Department level:

2022	Chair, promotion and tenure committee (Waynant)
2022	Member, 3rd year review committee (Andrasi)
2021-2022	Member, search committee, faculty position, Dept. Chemistry
2019, 2020	Chair, peer performance review committee
2017	Member, 3rd year review committee (Stoian)
2015	Member, promotion and tenure committee (Magolan)
2013-2018	Chair, graduate admissions and recruitment committee
2013	Member, promotion and tenure committee
2012	Member, 3rd year review committee (Magolan)
2010-2011; 2014-2015; 2017-2018; 2020	Member, chair's advisory committee
2009-2013	Member, graduate admissions committee (chair 2011-2012)
2009-2010	Member, search committee, Assistant Professor (Chemistry - organic)
2008-2011	Chair, graduate recruitment committee
2007	Member, exploratory committee, establishment of BS forensic chemistry degree
2006-2007	Member, committee for student-faculty relations
2006-2008	Faculty Secretary

Outreach:

2021	Helped design an experiment for a NASA-funded science project for Moscow cub scout pack 323 entitled "Plant Mars";
2021	Participated as a member of a faculty panel for the "Success in COS" program
2020	Interview in connection with a video entitled "Vandals Move Online Amid COVID19 Concerns"
2019	Contributed 1-page section to VandAlchemist, an alumni newsletter.
2018	Provided lab tour to Cub Scout Pack 323, Moscow, Idaho.
2017	Interview with the BLOT – a student magazine at the University of Idaho – concerning the Vandals Table Tennis Club.
2017	Interview with the Argonaut – the main student newspaper at the University of Idaho – concerning turnover of UI presidents.

2016	Interview with the Argonaut – the main student newspaper at the University of Idaho – concerning matters discussed at Faculty Senate.
2016	Participated in interview conducted by student working with the College of Science Student Ambassador program.
2015	Three interviews with the Argonaut – the main student newspaper at the University of Idaho – concerning matters discussed at Faculty Senate.
2013-present	Founder and editor of Departmental LinkedIn site.
2013	Extended Learning Internship Mentor for high school student (J. Cornwall, Moscow High School).
2013	Contributed article entitled "New study from Isis Pharmaceuticals on allele selective suppression of mutant Huntingtin in the central nervous system" to Oligonucleotide Therapeutics Society newsletter.
2013	Served as the formal university representative in discussions with Chairman Earl Sullivan from the Idaho Coalition for Innovation (The CORE).
2012	Interview with University Communications and Marketing Department in connection with development of new fundraising brochure.
2010	Interview articles with undergraduate researcher Mason Frederickson and Dr. Hrdlicka published on UI homepage.
2010	Interview articles with undergraduate researcher Mason Frederickson and Dr. Hrdlicka published in local newspaper, electronic news sites and UI media on the occasion of 2010 INBRE Conference.
2010	Article entitled "Nanomaterials for Biosensor Platforms Toward Increasing Safety and Shelf Life of Agricultural Commodities" (DE Aston, DN McIlroy, L Branen, S Rastogi, J Branen, G Corti, PJ Hrdlicka, K Noren and JJ Nagler) published in The World of Food Science.
2010	Interview articles published in UI Argonaut, UI Friday Letter, and regional newspapers and electronic news sites on the occasion of procuring the DoD award "Functionalized Nanospring mats for detection of explosive materials".
2009	Interview articles published in Vandal Science and regional newspapers and electronic news sites on the occasion of procuring the NIH award "Invader LNAs as novel Gene Specific Therapeutics".

Other Service:

Spring 2021	Participated in virtual undergraduate recruitment event at Post Falls High School
Fall 2016	Recruitment trips to Eastern Washington University and University of Alaska, Fairbanks
Summer 2016	Member, "Global Research Panel", Idaho INBRE Statewide Research Conference (Moscow, ID)
Fall 2014	Recruitment trips to Weber State University, Utah State University, Utah Valley University, Central Washington University, Brigham Young University (Idaho campus) and Idaho State University

Summer 2014	Recruiter at 69th Northwest Regional Meeting of the American Chemical Society (Missoula, MT)
Fall 2013	Recruitment trips to University of Montana, Eastern Washington University and Eastern Oregon University
Summers 2008-2016	Mentor, visiting undergraduates, INBRE REU program
Summers 2008-2011	Member, "Beyond Baccalaureate Discussion Panel", Idaho INBRE Seminar Series
Fall 2008	Co-host, ~15 potential transfer students from North Idaho College
Fall 2008	Participant, recruitment luncheon at Univ. Idaho for prospective graduate students from Brigham Young Univ
Spring 2008	Judge, UI Student Research Expo
Fall 2007	Recruitment trip, Gonzaga University
Summers 2007-2009	Mentor, visiting undergraduates, Neuroscience REU program
Fall 2007/2009/2010	Poster judge, Annual College of Science, Student Research Exposition, Univ. Idaho

Community Service:

2019	Hosted two table tennis practice sessions for Cub Scout Pack 323, Moscow, Idaho.
2008-present	Academic advisor and treasurer for the Vandals Table Tennis Club (2015-2019: secured ~$10,000 from the ASUI to purchase equipment; coordinated three student tournaments; maintains social media pages)

Honors and Awards:

2018	Recipient, Student Organization Advisor Award, Univ. Idaho

PROFESSIONAL DEVELOPMENT:

2020 Participant, webinar, I am afraid that my students are cheating, Univ. Idaho

2019 Participant, M.J. Murdock Trust Commercialization Initiation Program Info Session

2019 Participant, HERC IGEM Info Session

2019 Participant, webinar - Powerless to Powerful, Taking Control, Univ. Idaho

2019 Polyplexus Pilot 3 Proposers Day Webinar, Defense Science Office, DARPA

2018 Participant, mandatory training, IT Security Awareness, Univ. Idaho

2018 Participant, mandatory training, Creating a Respectful Community, Univ. Idaho

2018 Participant, mandatory training, Campus Security Authority Training, Univ. Idaho

2017 Participant, workshop – Center of Teaching Learning: Zoom Essentials, Univ. Idaho

2017 Participant, webinar – Strategic Thinking, Univ. Idaho

2016 Participant, workshop - Building Team Relationships

2016 Participant, webinar - Communicating Through Email: Top 10 Do's & Don'ts

2016 Participant, webinar - Public Speaking Without Fear, Univ. Idaho

2016 Participant, webinar - Defeating Negativity in the Workplace, Univ. Idaho

2016 Participant, webinar - How to Handle Emotions Under Pressure, Univ. Idaho

2016 Participant, mandatory training - Diversity & Inclusion at the University of Idaho

2016 Participant, mandatory training - IT Security

2016 Participant, mandatory training - Safety & Security Awareness

2015 Participant, mandatory training - University of Idaho Mission & Goals

2015 Participant, mandatory training - Performance Management

2015 Participant, mandatory training - Performance Evaluations

2015 Participant, mandatory training - Navigating the Employment Legal Landscape, Part 1

2015 Participant, mandatory training - Navigating the Employment Legal Landscape, Part 2

2015 Participant, mandatory training - Strategies for Selection & Hiring Success

2015 Participant, mandatory training - University of Idaho Stewardship of Resources & Ethical Conduct

2010 Participant, online course - Acuc101: Introduction to animal care and use, Univ. Idaho.

2010 Participant, "Write winning grants", Grant Writer's Seminar & Workshops, Idaho INBRE Program.

2010 Participant, annual retreat - Initiative for Bioinformatics and Evolutionary Studies (IBEST) Center.

2010 Participant, workshop - "So what ? who cares ? why you ?" hosted by Idaho TechConnect (Univ. Idaho), which presented commercialization success tools.

2008 Participant, annual retreat - Initiative for Bioinformatics and Evolutionary Studies (IBEST) Center.

2007 Participant, workshop - "NSF Days at WSU Spokane Riverpoint".

2007 Participant in three workshops on "Finding Funding/Responding to a Program Announcement", "Proposal Budget Development and Award Administration", and "Reviewer`s Perspective on Proposals" offered by Grant Development Specialists at Univ. Idaho.