

# Kevin Burgess: Texas A & M University

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## Summary of Career

2005 – present, Rachel Professor of Chemistry (endowed chair), TAMU; 1996 – 2005, Professor of Chemistry, TAMU; 1992 – 1996 Associate Professor of Chemistry, TAMU; 1987 – 1992 Assistant Professor of Chemistry, Rice University, TX; 1984 - 1987 Junior Research Fellow, Girton College, Cambridge, and Research Lecturer Christ Church Oxford

## Education

1983 – 1984, Postdoctoral Fellow, University of Wisconsin, with Professor Barry Trost; 1980 – 1983, PhD University of Cambridge, with Lord Lewis; 1979 – 1980, MSc University of East Anglia, with Professor Alan Katritzky; 1976 – 1979, BSc University of Bath

## Publications Summary

over 330 publications, H-index 81 as of May 2021, five patents, editor of *Solid Phase Syntheses*, and sole author of the graduate problem set book *Organic Chemistry By Inquisition*. Coauthor of *Highlights in Chemistry and Industry* since 1985, since 2012 for the “Biomedical Chemistry” column.

## General Research Areas

organic, medicinal, organometallic, fluorescent dyes, and combinatorial chemistry

## Specific Research Interests

small molecule to perturb protein-protein interactions • small molecule for targeting cancer cells • asymmetric hydrogenations of substrates without classical coordinating groups • through-bond energy transfer fluorescent dyes for multiplexing • BODIPY dye chemistry • combinatorial methods for catalyst discovery and optimization • delivery of proteins into cells • small molecule ligands for the Trk receptors (one compound in clinical trials) • solid phase syntheses • dyes for DNA sequencing • DNA sequencing by synthesis • manganese catalyzed epoxidations using hydrogen peroxide • syntheses and applications of cyclopropene amino acids • catalyzed hydroborations • biocatalytic syntheses of useful chirons • syntheses and reactions of chiral sulfoxides

## Other Indicators of Esteem

Fulbright Scholar Award 2021 • Alexander Humboldt Fellow (2016), Pedler Award from Royal Society of Chemistry (2013), Fellow of the Royal Society of Chemistry (2013), TAMU AFS Distinguished Achievement Award in Research (2010), Novartis International Lectureship (2002-3), Alfred P. Sloan Research Fellow (1993-5), NIH Research Career Development Award (1992-7), Fulbright Travel Award (1983), Sir Henry Stracosh Travel Grant (1983), Master's Thesis Award in Chemistry UEA (1980), BSc Chemistry Prize, Bath University, UK (1979). Associate Editor for *Tetrahedron Asymmetry* for several years.

## Experience As Expert Witness

(side represented underlined)

*Pfizer v. Mylan Labs*, et al., No. 02-1628, Western District of Pennsylvania (declarations, deposition and trial, for Mylan). This case involved patents surrounding a process for manufacture of amlodipine.

*Sanofi-Aventis U.S. LLC, et al., v. Fresenius Kabi Oncology PLC*, et al., No. 07-02854, District of New Jersey (declarations, deposition, for Fresenius) *Aventis Pharma, S.A. et al., v. Dabur Pharma, LTD.*, in the Republic of the Philippines, Regional Trial Court, Civil Case No. 06-747 (declarations, deposition and trial, for Dabur) *Sanofi-Aventis (Malaysia) SDN BHD et al., v. Fresenius Kabi (Malaysia) SDN BHD et al.*, in the Republic of Malaysia, High Court of Malaya, Case No. D-22IP-46 (declarations, deposition and trial, for Fresenius). This case involved patents surrounding a process for manufacture of taxol.

Illumina Inc. vs Patent of the Trustees of Columbia University in the City of New York (IPR 2013-00011, IPR 2012-00006, IPR 2012-00007) (deposition and declaration for Illumina). This case involved DNA sequencing methodologies involving fluorescent dyes.

United Food and Commercial Workers Union and Employers Midwest Health Benefits Fund represented by Cohen Milstein Sellers & Toll PLLC vs AstraZeneca, MDL No. 2409, State of Massachusetts. (two declarations and deposition for United Foods). This case involved patents surrounding a process for manufacture of omnipresol.

Intelligent Bio-systems Inc., vs Illumina Inc., IPR2013-00517. (declaration and deposition for Illumina). This case involved DNA sequencing methodologies involving fluorescent dyes.

Amneal Pharmaceuticals, LLC vs Endo Pharmaceuticals, IPR 2014-00160 (declaration and deposition), Sterne, Kessler, Goldstein & Fox. This case involved opioid pharmaceuticals.

Retained to by attorneys from Illumina, for C. A. 12-435 involving Enzo Life Sciences. This case did not go far.

The Regents of the University of California, Becton, Dickinson and Company, Sirigen, Inc., and Sirigen Ltd, vs Affymetrix Inc. and Life technologies Corporation, (Defendants). Case No. 17-CV-1394-H-NLS. This long case involved fluorescent dyes for biotechnology, particularly for fluorescence activated cell sorting. I provided at least three expert reports, and was deposed twice. The case settled just before trial. Mr Tom Watson at Latham Watkins (see below for reference) was my prime contact, and I also dealt with Roger Chin.

Actelion Pharmaceutical Ltd vs AurobindoPharma USA. Case No.: 3:19-cv-15437-FLW-LHG. This involves patent infringement featuring a drug called Macitentan.

Illumina Inc and Illumina Cambridge Ltd (Plaintiffs) vs BGI Genomics Co Ltd, BGI Americas Corp, MGI Tech Co Ltd, MGI Americas Inc, and Complete Genomics Inc, Case No. 3:20-cv-01465. Deposed Mar 27 2020.

Illumina Inc and Illumina Cambridge Ltd (Plaintiffs) vs BGI Genomics Co Ltd, BGI Americas Corp, MGI Tech Co Ltd, MGI Americas Inc, and Complete Genomics Inc, Case No. 3:19-cv-03770-WHO.

Illumina Cambridge Limited Claimant vs Latvia MGI Tech Sia, MGI Tech Co. MGI International Sales Co., BGI Complete Genomics Hong Kong Co., Filed In In The High Court Of Justice, Business And Property Courts Of England And Wales, Claim No. Hp-2019-000052

Illumina Inc. et al v. BGI Genomics Co., BGI America's Corp., MGI Americas Inc., Case No. 19-970-MN. Filed report Jun 2021.

Becton Dickinson & Co, Sirigen, Inc., Sirigen II Limited v. Beckman Coulter, Inc., No. 21-cv-01173-WQH-MSB (S.D. Cal.). Recruited Jun 2021.

### **Potential Referees**

Jeff Costakos, Foley & Lardner. [JCostakos@foley.com](mailto:JCostakos@foley.com)

Robert Lawler, Reinhart Boerner. [RLawler@reinhartlaw.com](mailto:RLawler@reinhartlaw.com)

George Farah, Cohen Milstein, Sellers and Toll. [gfarah@cohenmilstein.com](mailto:gfarah@cohenmilstein.com)

Tom Watson, Latham Watkins, [Thomas.Watson@lw.com](mailto:Thomas.Watson@lw.com), (858) 523-5400.

## Some of My Publications On Dyes and On Medicinal Chemistry

### 2016

- 304 Small Molecules for Active Targeting in Cancer, C. S. Kue, A. Kamkaew, K. Burgess, L. V. Kiew, L. Y. Chung, H. B. Lee, *Med. Res. Rev.*, 2016, **36**, 494-575.
- 303 Anthranilic Acid-containing Cyclic Tetrapeptides: At the Crossroads of Conformational Rigidity and Synthetic Accessibility, D. Xin, K. Burgess, *Org. Biomol. Chem.*, 2016, **14**, 5049-5058. (DOI: 10.1039/C6OB00693K)
- 302 Chitosan-coated poly(lactic-co-glycolic acid)-diiodinated boron-dipyrromethene nanoparticles improve tumor selectivity and stealth properties in photodynamic cancer therapy, L. Chung, K. Burgess, *J. Mat. Chem. B*, 2015, in press.

### 2015

- 301 Aza-BODIPY Dyes With Enhanced Hydrophilicity, A. Kamkaew, K. Burgess, *Chem. Comm.*, 2015, **51**, 10664-7.
- 300 Oligoethylene Glycol-strapped Aza-BODIPY Dyes, S. Thavornpradit, T. Puangsamlee, A. Kamkaew, D. Xin, N. Wanichacheva, K. Burgess, *Org. Biomol. Chem.*, 2015, **13**, 8271-6. DOI: 10.1039/c5ob01104c.
- 299 Extended Piperidine-piperidinone Protein Interface Mimics, D. Xin, A. Raghuraman, K. Burgess, *J. Org. Chem.*, 2015, **80**, 4450-4458. (DOI 10.1021/acs.joc.5b00300).
- 298 Protein-protein Interface Mimicry By An Oxazoline Piperidine-2,4-dione, X. Li, J. Taechalertpaisarn, D. Xin, K. Burgess, *Org. Lett.*, 2015, **17**, 632-635. (DOI 10.1021/ol5036547)
- 297 Targeted PDT Agent Eradicates TrkC Expressing Tumors Via Photodynamic Therapy (PDT), C. S. Kue, A. Kamkaew, H. B. Lee, L. Y. Chung, L. V. Kiew, K. Burgess, *Mol. Pharmaceutics*, 2015, **12**, 212-22.

### 2014

- 296 *In Vivo* Studies of Nanostructure-Based Photosensitizers for Photodynamic Cancer Therapy, S. H. Voon, L. V. Kiew, H. B. Lee, S. H. Lim, M. I. Noordin, A. Kamkaew, K. Burgess and L. Y. Chung, *Small*, 2014, **10**, 4993-5013.
- 295 Small Molecule Probes that Perturb A Protein-protein Interface In Antithrombin, D. Xin, A. Holzenburg, K. Burgess, *Chem. Sci.*, 2014, **5**, 4914-4921. DOI: 10.1039/c4sc01295j.
- 291 Rosamines Targeting the Cancer Oxidative Phosphorylation Pathway, S. H. Lim, L. Wu, V. Kiew, L. Y. Chung, K. Burgess, H. B. Lee, *PLOS One*, 2014, **9**, e82934.

### 2013

- 289 Double-targeting Using a TrkC-Ligand Conjugated to BODIPY-based PDT Agent, A. Kamkaew, K. Burgess, *J. Med. Chem.*, 2013, **56**, 7608-14. (DOI 10.1021/jm40121421). NIHMSID527496
- 287 Expanding the Scope of Oligo-pyrrolinone-pyrrolidines as Protein-protein Interface Mimics, A. Raghuraman, D. Xin, L. M. Perez, K. Burgess, *J. Org. Chem.*, 2013, **78**, 4823-4833, (DOI: 10.1021/jo400323K)

286 Evaluating Minimalist Mimics by Exploring Key Orientations on Secondary Structures (EKO), D. Xin, E. Ko, L. M. Perez, T. R. Ioerger, K. Burgess, *Org. Biomol. Chem.*, 2013, **11**, 7789-801. (DOI: 10.1039/c3ob41848k)

283 Exploring Key Orientations at Protein-Protein Interfaces with Small Molecule Probes, E. Ko, A. Raghuraman, L. M. Perez, T. R. Ioerger, K. Burgess, *J. Am. Chem. Soc.*, 2013, **135**, 167-173.

## 2012

282 Small Molecule Ligands for Active Targeting of TrkC-expressing Tumor Cells, E. Ko, A. Kamkaew, K. Burgess, *ACS Med. Chem. Lett.*, 2012, **3**, 1008-1012.

281 BODIPY Dyes in Photodynamic Therapy, A. Kamkaew, S. H. Lim, H. B. Lee, L. V. Kiew, L. Y. Chung, K. Burgess, *Chem. Soc. Rev.*, 2012, **42**, 77-88.

280 Omegatides: Constrained Analogs of Peptide Primary Sequence, D. Fedoseyenko, A. Raghuraman, E. Ko, K. Burgess, *Org. Biomol. Chem.*, 2012, **10**, 921-4.

## 2011

274 Cationic Polyfluorenes for Intracellular Delivery of Proteins, A. Kamkaew, R. Barhoumi, R. C. Burghardt, K. Burgess, *Org. Biomol. Chem.*, 2011, **9**, 6513-8.

273 Highly Efficient and Photostable Photonic Materials from Diiodinated BODIPY Laser Dyes, M. E. Pérez-Ojeda, C. Thivierge, V. Martin, A. Costela, K. Burgess and In. García-Moreno, *Opt. Mat. Exp.*, 2011, **1**, 243-51.

272 Pyrrolinone-pyrrolidine Oligomers as Universal Peptidomimetics, A. Raghuraman, E. Ko, K. Burgess, *J. Am. Chem. Soc.*, 2011, **133**, 12350-12351. PMID 21780756

271 Minimalist and Universal Peptidomimetics, E. Ko, J. Liu, K. Burgess, *Chem. Soc. Rev.*, 2011, **40**, 4411-4421.

270 Brilliant BODIPY-fluorene Copolymers With Dispersed Absorption and Emission Maxima, C. Thivierge, A. Loudet, K. Burgess, *Macromolecules*, 2011, **44**, 4012-4015.

269 Pyrrole-based Scaffolds for Turn Mimics, E. Ko, K. Burgess, *Org. Lett.*, 2011, **13**, 980-3. PMC 3077957

268 Energy Transfer Cassettes in Silica Nanoparticles Target Intracellular Organelles, J. Jose, A. Loudet, Y. Ueno, L. Wu, H.-Y. Chen, D. H. Son, R. Barhoumi, R. Burghardt, K. Burgess, *Org. Biomol. Chem.*, 2011, **9**, 3871-77.

267 Universal Peptidomimetics, E. Ko, J. Liu, L.M. Perez, G. Lu, A. Schaefer, K. Burgess, *J. Am. Chem. Soc.*, 2011, **133**, 462-77. PMC3139828

266 Fluorescent Proton Sensors Based on Energy Transfer, C. Thivierge, J. Han, R. M. Jenkins, K. Burgess, *J. Org. Chem.*, 2011, **76**, 5219-28. PMC3130547

265 Organelle-selective Energy Transfer: A Fluorescent Indicator of Intracellular Environment, A. Loudet, Y. Ueno, L. Wu, J. Jose, R. Barhoumi, K. Burgess, *Bioorg. Med. Chem. Lett.*, 2011, **21**, 1849-51.

- 264 Encapsulated Energy Transfer Cassettes With Extremely Well Resolved Fluorescent Outputs, Y. Ueno, J. Jose, A. Loudet, C. Perez-Bolivar, P. Anzenbacher, K. Burgess, *J. Am. Chem. Soc.*, 2011, **133**, 51-5. PMID 21105708

## 2010

- 263 BODIPY® Dyes and Their Derivatives: Syntheses and Spectroscopic Properties, in "Handbook of Porphyrin Science: With Applications to Chemistry, Physics, Materials Science, Engineering, Biology and Medicine", A. Loudet, K. Burgess; Ed. K. Kadish, K. Smith, R. Guilard, World Scientific, 2011, 203.
- 261 Intracellular Imaging of Organelles with New Water-soluble Benzaphenoxazine Dyes, J. Jose, A. Loudet, Y. Ueno, R. Barhoumi, R.C. Burghardt, K. Burgess, *Org. Biomol. Chem.*, 2010, **8**, 2052-9. PMID 20401381
- 260 A Combinatorial Approach for Targeted Delivery using Small Molecules and Reversible Masking to Bypass Non-Specific Uptake In Vivo, Q. Shi, A. Nguyen, Y. Angell, D. Deng, C.-R. Na, K. Burgess, D. Roberts, F. C. Brunicardi, N. Templeton, *Gene Ther.*, 2010, **17**, 1085-97. PMID 20463761
- 259 *In Vitro* and *In Vivo* Photocytotoxicity of Boron Dipyrromethene Derivatives for Photodynamic Therapy, S. H. Lim, C. Thivierge, P. Nowak-Sliwinska, J. Han, H. Van den Bergh, G. Wagnieres, K. Burgess, H. B. Lee, *J. Med. Chem.*, 2010, **53**, 2865-74. PMID 20199028
- 257 Fluorescent Indicators for Intracellular pH, J. Han, K. Burgess, *Chem. Rev.*, 2010, **110**, 2709-28. PMID 20401381
- 256 A Monovalent Agonist of TrkA Tyrosine Kinase Receptors Can Be Converted into a Bivalent Antagonist, F. Brahim, J. Liu, A. Malakhov, S. Chowdhury, E. Purisima, L. Ivanisevic, A. Caron, K. Burgess, H. Saragovi, *Biochim. Biophys. Acta*, 2010, **1800**, 1018-26. PMID 20600627
- 255 Bivalent Diketopiperazine-based TrkC Antagonists, J. Liu, F. Brahim, H. U. Saragovi, K. Burgess, *J. Med. Chem.*, 2010, **53**, 5044-8. PMID 20540510
- 254 In Glaucoma the Up-regulated Truncated TrkC.T1 Receptor Isoform in Glia Causes Increased TNF- $\alpha$  Production, leading to retinal ganglion cell death, Y. Bai, Z. Shi, Y. Zhuo, J. Liu, A. Malakhov, E. Ko, K. Burgess, H. Schaefer, P. Esteban, L. Tessarollo, and H. Saragovi, *Invest. Ophthalmol. Vis. Sci.*, **51**, 6639-51. PMID 20574020

## 2009

- 253 A Peptidomimetic of NT-3 acts as a TrkC antagonist, F. Brahim, A. Malakhov, H. B. Lee, M. Pattawarapan, L. Ivanisevic, K. Burgess, H. U. Saragovi, *Peptides*, 2009, 1833-9.
- 252 Energy transfer dyads based on Nile Red, J. Jose, Y. Ueno, J.C. Castro, L. Li, K. Burgess, *Tetrahedron Lett.*, 2009, **50**, 6442-5.
- 250 New Cytotoxic Rosamine Derivatives Selectively Accumulate in the Mitochondria of Cancer Cells, S.A. Lim, L. Wu, K. Burgess, H.B. Lee, *Anti-Cancer Drugs*, 2009, **20**, 461-8.
- 249 Fluorescent Cassettes for Monitoring Three-component Interactions *In Vitro* and *Ex Vivo*, L. Wu, A. Loudet, R. Barhoumi, R.C. Burghardt, K. Burgess, *J. Am. Chem. Soc.*, 2009, **131**, 9156-7.

- 248 Bivalent Peptidomimetic Ligands of TrkC are Biased Agonists, Selectively Induce Neuritogenesis, or Potentiate Neurotrophin-3 Trophic Signals, K. Burgess, D. Chen, F. Brahim, *ACS Chem. Biol.*, 2009, **4**, 769-81.
- 247 Synthesis of Regiosomerically Pure 5-Functionalized 2', 7'-Dichlorofluoresceins, K. Burgess, J. C. Castro, A. Malakhov, *Synthesis*, 2009, **7**, 1224-6.
- 245 Photophysics and Stability of Cyano-Substituted Boradiazaindacene Dyes, K. Cieslik-Boczula, K. Burgess, L. Li, B. Nguyen, L. Pandey, W. M. De Borggrae, M. Van der Auweraer, N. Boens, *Photochem. Photobiol.*, 2009, **8**, 1006-15.
- 244 A Ratiometric pH Reporter For Imaging Protein-dye Conjugates in Living Cells, J. Han, A. Loudet, R. Barhoumi, R. Burghardt, K. Burgess, *J. Am. Chem. Soc.*, 2009, **131**, 1642-3.
- 243 Water-soluble Nile Blue Derivatives: Syntheses and Photophysical Properties, J. Jose, Y. Ueno, K. Burgess, *Chem.—Eur. J.*, 2009, **15**, 418-23.
- 242 3- and 5-Functionalized BODIPYs via The Liebeskind-Srogl Reaction, J. Han, O. Gonzalez, A. Aguilar-Aguilar, E. Pena-Cabrera K. Burgess, *Org. Biomol. Chem.*, 2009, **7**, 34-6.

## 2008

- 241 B,O-Chelated Azadipyromethenes as Near-IR Probes, K. Burgess, A. Loudet, R. Bandichhor, A. Palma, S. McDonnell, M. Hall, *Org. Lett.*, 2008, **10**, 4771-4. (Highlighted in *Synfacts* 2009, **2**, 150.)
- 240 A New Synthesis of Symmetric Boraindacene (BODIPY) Dyes, L. Wu, K. Burgess, *Chem. Commun.*, 2008, **40**, 4933-5.
- 239 Non-Covalent Delivery of Proteins into Mammalian Cells, A. Loudet, J. Han, R. Barhoumi, J-P. Pellois, R. C. Burghardt, K. Burgess, *Org. Biomol. Chem.*, 2008, **6**, 4516-22. PMID 19039359
- 238 Synthesis and Spectroscopic Properties of Rosamines with Cyclic Amine Substituents, L. Wu, K. Burgess, *J. Org. Chem.*, 2008, **73**, 8711-8.
- 236 Fluorescent Amino-and Thiopyronin Dyes, L. Wu, K. Burgess, *Org. Lett.*, 2008, **10**, 1779-82. (Highlighted in *Synfacts*, 2008, **7**, 699.)
- 235 Syntheses of Highly Fluorescent GFP-chromophore Analogs, L. Wu, K. Burgess, *J. Am. Chem. Soc.*, 2008, **130**, 4089-96.
- 234 Functionalization of the 4,4-Difluoro-4-bora-3a,4a-diaza-s-indacene (BODIPY) Core, L. Li, B. Nguyen, K. Burgess, *Biorg. Med. Chem. Lett.*, 2008, **18**, 3112-6.
- 233 Syntheses and Spectral Properties of Functionalized, Water-soluble BODIPY Derivatives, L. Li, J. Han, B. Nguyen, K. Burgess, *J. Org. Chem.*, 2008, **73**, 1963-70.
- 232 Iridium-Catalyzed Asymmetric Hydrogenation of Vinyl Ether, Y. Zhu, K. Burgess, *Adv. Synth. Catal.*, 2008, **350**, 979-83. (Highlighted in *Synfacts* 2008, **7**, 733.)



- 231 Lipid Diffusion from Single Molecules of a Labeled Protein Undergoing Dynamic Association with Giant Unilamellar Vesicles and Supported Bilayers, A. Sharonov, R. Bandichhor, K. Burgess, A. Petrescu, F. Schroeder, A. Kier, R. Hochstrasser, *Langmuir*, 2008, **24**, 844-50.
- 230 Functionalized BF<sub>2</sub> Chelated Azadipyrromethene Dyes, A. Loudet, R. Bandichhor, L. Wu, K. Burgess, *Tetrahedron*, 2008, **64**, 3642-54.
- 229 A Combinatorial Method for Solution-phase Synthesis of Labeled Bivalent  $\beta$ -Turn Mimics, Y. Angell, D. Chen, F. Brahim, H. U. Saragovi, K. Burgess, *J. Am. Chem. Soc.*, 2008, **130**, 556-65.

## 2007

- 228 BODIPY<sup>®</sup> Dyes and Their Derivatives: Syntheses and Spectroscopic Properties, A. Loudet, K. Burgess, *Chem. Rev.*, 2007, **107**, 4891-932.