**Rafal Fudala, PhD**

# Assistant Professor

Dept. Microbiology, Immunology & Genetics

UNT Health Science Center, Fort Worth, TX, 76107 [Email: Rafal.Fudala@unthsc.edu](mailto:Email:%20Rafal.Fudala@unthsc.edu)

Phone#: 817-735-0102



**Research Interests:** Cancer Drug Development, Early Cancer Detection, Fluorescence Spectroscopy, Optical Imaging and Biophysical Applications of Fluorescent Dyes.

## Work Experience/Positions

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| *Sept. 2017-Present* | **Assistant Professor,**  Department of Microbiology, Immunology & Genetics, University of North Texas Health Science Center at Fort Worth, Fort Worth, Texas. Assistant Director, Lipoprotein Drug Delivery Research Laboratory, HDL Drug Delivery Initiative (October 2019-present). |
| *Aug. 2018- Present* | **Adjunct Professor (Biology),**  Tarrant County Community College, Fort Worth TX |
| *Feb. 2012 – Aug. 2017* | **Instructor (independent faculty position),**  Center for Fluorescence Technologies and Nanomedicine, Institute for Molecular Medicine, University of North Texas Health Science Center at Fort Worth, Fort Worth, Texas. |
| *Feb. 2010 – Feb. 2012* | **Postdoctoral Research Associate,**  Department of Microbiology and Immunology University of North Texas Health Science Center at Fort Worth, Fort Worth, Texas**.** |
| *Sept. 2004 – Jan. 2010* | **Postdoctoral Research Associate,**  Department of Biochemistry, University of Texas, Health Science Center at Tyler, Tyler, Texas. |
| *Feb. 2004 – Aug. 2017* | **Research Assistant**,  Institute of Biology, Jan Kochanowski University, Kielce, Poland. |

**Education**

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| *1999 – 2004* | **Ph.D. Student,** Department of Microbiology and Immunology, University of Lodz, Lodz, Poland.  *Coursework* - Microbiology and Immunology, Biochemistry, Molecular and Cell Biology, Biophysics, Urinary Tract Infection. |
| *1995 - 1999* | **MS Student,** Department of Biochemistry, University of Lodz, Lodz, Poland.  Coursework – Biochemistry, Biophysics, Microbiology and Immunology, Molecular and Cell Biology, B-cell leukemia. |

**Book Chapters**

1. **Fudala R**, Rich RM, Kimball J, Gryczynski I, Raut S, Borejdo J, Stankowska DL, Krishnamoorthy RR, Gryczynski K, Maliwal BP, Gryczynski Z. Multiple-Pulse Pumping with Time-Gated Detection for Enhanced Fluorescence Imaging in Cells and Tissue. P. Kapusta et al. (eds.), Advanced Photon Counting: Applications, Methods, Instrumentation, Springer Ser Fluoresc, **(2014)** 1-15 pp, DOI 10.1007/4243\_2014\_68.
2. K. Midde, R. M. Rich, V. Hohreiter, S. L. Raut, R. Luchowski, C. Hinze, **R. Fudala**, I. Gryczynski, Z. Gryczynski, J. Borejdo. "Rotation of myosin lever arms during isometric contraction of skeletal myofibrils". In Skeletal Muscle: Physiology, Classification and Disease, M. Willems, Editor, Nova Science Publishers: Chichester, United Kingdom. **(2012)**, pp. 1-24.

**Peer-Reviewed Publications:**

1. Raut SG, Garud A, Nagarajan B, Sabnis N, Remaley A, **Fudala R**, Gryczynski I, Gryczynski Z, Dzyuba SV, Borejdo J, Lacko AG. Probing the Assembly of HDL Mimetic, Drug Carrying Nanoparticles, using Intrinsic Fluorescence. J Pharmacol Exp Ther. **(2020)** Jan 15;jpet.119.262899. doi: 10.1124/jpet.119.262899. [Epub ahead of print]. PMID: 31941718
2. Gryczynski Z, Kimball J, **Fudala R,** Chavez J, Ceresa L, Szabelski M, Borejdo J, Gryczynski, I. Photophysical properties of 2-Phenylindole in poly (vinyl alcohol) film at room temperature. Enhanced phosphorescence anisotropy with direct triplet state excitation. Methods and Applications in Fluorescence **(2019).** Accepted, in press.
3. Stankowska DL1, Nam MH, Nahomi RB, Chaphalkar RM, Nandi SK, **Fudala R**, Krishnamoorthy RR, Nagaraj RH. Systemically administered peptain-1 inhibits retinal ganglion cell death in animal models: implications for neuroprotection in glaucoma. Cell Death Discov. **(2019)** Jul 31;5:122.
4. Synak A, Serdiuk I.E, Grobelna B, **Fudala R**, Gryczynski I, Bojarski P. Spectroscopic method for estimation of MMP-9 enzyme concentration and activity, Journal of Molecular Liquids **(2019)**, 288:110936, <https://doi.org/10.1016/j.molliq.2019.110936>.
5. Borejdo J, Gryczynski Z, **Fudala R**, Joshi CR, Borgmann K, Ghorpade A, Gryczynski I. Surface plasmon-assisted microscope. J Biomed Opt. **(2018)** Jun;23(6):1-4. doi: 10.1117/1.JBO.23.6.060502.
6. Synak A, **Fudala R**, Gryczynski I, Kułak L, Shah S, Serdiuk IE, Grobelna B, Arłukowicz P, Kubicki A, Bojarski P. AMCA to TAMRA long range resonance energy transfer on a flexible peptide. Dyes and Pigments **(2018)**, 158:60-64. doi: 10.1016/j.dyepig.2018.05.019.
7. Synak A, Bojarski P, Grobelna B, Gryczynski I, **Fudala R**, Monka M. Enhanced emission of Nile Red on plasmonic platforms. Optical Materials. **(2018)**, 78:82-87.
8. Requena S, Ponomarchuk O, Castillo M, Rebik J, Brochiero E, Borejdo J, Gryczynski I, Dzyuba S, Gryczynski Z, Grygorczyk R, **Fudala R.** Imaging viscosity of intragranular mucin matrix in cystic fibrosis cells. Sci Rep. **(2017),** 7(1):16761. doi: 10.1038/s41598-017-17037-2.
9. Borejdo J, Nagwekar J, Duggal D, Raut S, Rich R, **Fudala R**, Das H, Gryczynski Z and Gryczynski I. Actomyosin Function in Left and Right Ventricles of Failing Human Hearts is Identical. Austin Cardiol. **(2017),** 2(2): 1011.
10. Duggal D, Nagwekar J, Raut S, Rich R, Das H, Patel V, Gryczynski I, **Fudala R**, Gryczynski Z, Blair Ch, Campbell KS, Borejdo J. No Difference in Kinetics and Spatial Distribution of Myosin of the Left and Right Ventricles of Human Hearts. Frontiers in Physiology **(2017),** 8:732.  <https://doi.org/10.3389/fphys.2017.00732>
11. Shah S, Chandra A, Kaur A, Sabnis N, Lacko A, Gryczynski Z, **Fudala R**, Gryczynski I. Fluorescence properties of doxorubicin in PBS buffer and PVA films. Journal of Photochemistry and Photobiology B: Biology **(2017)**, 170: 65–69.
12. Shah S, Mandecki W, Li J, Gryczynski Z, Borejdo J, Gryczynski I, **Fudala R**. FRET Study in Oligopeptide-linked Donor-Acceptor System in PVA Matrix. Methods and Applications in Fluorescence **(2016)** 4 047002.
13. Chib R, Requena S, Mummert M Strzhemechny Y, Gryczynski I, Borejdo J, Gryczynski Z, **Fudala R**. Fluorescence lifetime imaging with time-gated detection of hyaluronidase using a long lifetime azadioxatriangulenium (ADOTA) fluorophores. Methods and Applications in Fluorescence 4 **(2016)** 047001.
14. Nagwekar J, Duggal D, **Fudala R**, Gryczynski I, Raut S, Gryczynski Z, Borejdo J. Differences in the spatial distribution of actin in the left and right ventricles of functioning rabbit hearts. Medical Photonics **(2016)** in press, <http://dx.doi.org/10.1016/j.medpho.2016.07.001>
15. Chib R, Mummert M, Bora I, Laursen BW, Shah S, Pendry R, Gryczynski I, Borejdo J, Gryczynski Z, **Fudala R.** Fluorescent biosensor for the detection of hyaluronidase: intensity-based ratiometric sensing and fluorescence lifetime-based sensing using a long lifetime azadioxatriangulenium (ADOTA) fluorophore. Anal Bioanal Chem. **(2016)** 408:3811–3821, doi:10.​1007/​s00216-016-9472-5
16. Requena S, Raut S, Doan H, Kimball J, **Fudala R**, Borejdo J, Gryczynski I, Strzhemechny Y, Gryczynski Z. Multi-pulse pumping for far-field super-resolution imaging. Proc. of SPIE **(2016)** Vol. 9714 97140F-1. doi: 10.1117/12.2221921
17. Raut S, Kimball JD, **Fudala R**, Bora I, Chib R, Jaafari H, Castillo M, Smith NW, Dzyuba AV, Gryczynski Z. Triazine-based BODIPY trimer as a molecular viscometer. Phys. Chem. Chem. Phys., **(2016)**, DOI: 10.1039/C5CP07214J.
18. Chib R, Shah S, Gryczynski Z, **Fudala R,** Borejdo J, Zelent B, Corradini MG, Ludescher RD Gryczynski I. Standard reference for instrument response function in fluorescence lifetime measurements in visible and near infrared. Meas. Sci. Technol. 27 **(2016)** 027001 (6pp)
19. Shah S, Gryczynski Z, Chib R, **Fudala R**, Baxi A, Borejdo J, Synak A, Gryczynski I. Demonstration of FRET in solutions. Methods Appl. Fluoresc. 4 **(2016)** 015001.
20. Duggal D, Nagwekar J, Rich R, Huang W, Midde K, **Fudala R**, Das H, Gryczynski I, Szczesna-Cordary D, Borejdo J. Effect of a myosin regulatory light chain mutation K104E on actin-myosin interactions. Am J Physiol Heart Circ Physiol. **(2015)** May 15;308(10):H1248-57. doi: 10.1152/ajpheart.00834.2014. Epub 2015 Mar 13.
21. Nagwekar J, Duggal D, Midde K, Rich R, Liang J, Kazmierczak K, Huang W, **Fudala R**, Gryczynski I, Gryczynski Z, Szczesna-Cordary D, Borejdo J. A Novel Method of Determining the Functional Effects of a Minor Genetic Modification of a Protein. Front. Cardiovasc. Med. **(2015)** 2:35. doi: 10.3389/fcvm.2015.00035
22. Duggal D, Nagwekar J, Rich R, Huang W, Midde K, **Fudala R**, Gryczynski I, Szczesna-Cordary D, Borejdo J. Effect of a Myosin Regulatory Light Chain mutation K104E on Actin-Myosin Interactions. Am J Physiol Heart Circ Physiol. **(2015)** Mar 13:ajpheart.00834.2014. doi: 10.1152/ajpheart.00834.2014.
23. Nagwekar J, Duggal D, Rich RM, Raut S, **Fudala R**, Gryczynski I, Gryczynski Z, Borejdo J. Spatial Distribution of Actin and Mechanical Cycle of Myosin are Different in Right and Left Ventricles of Healthy Mouse Hearts. Biochemistry, **(2014),** Dec 9;53(48):7641-9. doi: 10.1021/bi501175s
24. Raut S, Kimball J, **Fudala R,** Doan H, Maliwal B, Sabins N, Lacko A, Gryczynski I, Dzyuba SV, Gryczynski Z. Homodimeric BODIPY Rotor as a Fluorescent Viscosity Sensor for Membrane-Mimicking and Cellular Environments. Physical Chemistry Chemical Physics, **(2014),** DOI: 10.1039/C4CP04260C.
25. Sthoyko T, Raut S, Rich RM, Sronce RJ, **Fudala R,** Mason R, AkopovaI, Gryczynski Z, Gryczynski I. Preparation of Plasmonic Platforms of Silver Wires on Gold Mirrors and Their Application to Surface Enhanced Fluorescence. ACS Appl. Mater. Interfaces, Accepted Manuscript **(2014)**, 6, 18780−18787, DOI: 10.1021/am504431j.
26. Raut S, Maliwal B, Shumilov D, Rich R, **Fudala R**, Chib R, Kokate R, Butler S, Gryczynski Z, Gryczynski I. Photophysics, RET Probes and Imaging Applications for Fluorescent BSA Au Nanoclusters. Biophysical Journal, Volume 106, Issue 2, Supplement 1, 28 January **(2014),** Page 401a.
27. Raut S, **Fudala R**, Rich RM, Kokate R, Chib R, Gryczynski Z, Gryczynski I. Long Lived BSA Au Clusters as a Time Gated Intensity Imaging Probe. Nanoscale **(2014)**. **6:**2594-2597. DOI: 10.1039/C3NR05692A.
28. Duggal D, Nagwekar J, Rich R, Midde K, **Fudala R**, Gryczynski I, Borejdo J. Phosphorylation of Myosin Regulatory Light Chain Has Minimal Effects on Kinetics and Distribution of Orientations of Cross-Bridges of Rabbit Skeletal Muscle. Am J Physiol Regul Integr Comp Physiol. **(2014)** Feb;306(4):R222-33. doi: 10.1152/ajpregu.00382.2013
29. Raut S, Rich RM, **Fudala R**, Butler S, Kokate R, Gryczynski Z, Luchowski R, Gryzcynski I. Resonance Energy Transfer Between Fluorescent BSA Protected Au Nanoclusters and Organic Fluorophores. Nanoscale **(2014)** Jan 7;6(1):385-91. doi: 10.1039/c3nr03886f
30. Shumilov D, Popov A, **Fudala R**, Akopova I, Gryczynski I, Borejdo J, Gryczynski Z, Grygorczyk R. Real-time imaging of exocytotic mucin release and swelling in Calu-3 cells using Acridine Orange. Methods **(2014)** Mar 15;66(2):312-24. doi: 10.1016/j.ymeth.2013.09.004.
31. Rich RM, Gryczynski I, **Fudala R**, Borejdo J, Stankowska DL, Krishnamoorthy RR, Raut S, Maliwal BP, Shumilov D, Doan H, Gryczynski Z. Multiple-pulse pumping for enhanced fluorescence detection and molecular imaging in tissue. Methods **(2014)** Mar 15;66(2):292-8. doi: 10.1016/j.ymeth.2013.08.026.
32. Kimball J, Shumilov D, Maliwa B, Zerda YW, Rout B, **Fudala R**, Raut R, Gryczynski I, Simanek E, Borejdo J, Rich R, Akopova I, Gryczynski Z. Fluorescent nanodiamonds for ultrasensitive detection. *Proc. SPIE* 8950, Single Molecule Spectroscopy and Superresolution Imaging VII, 89501H (March 4, **2014**); doi:10.1117/12.2045376; **http://dx.doi.org/10.1117/12.2045376**
33. Kimball J, Shumilov D, **Fudala R,** Raut S, Gryczynski I, Borejdo J, Akopova I, Grygorczyk R, Gryczynski Z. Simple multipulse excitation for enhanced detection of long-lived fluorophores. *Proc. SPIE*8950, Single Molecule Spectroscopy and Superresolution Imaging VII, 895005 (March 4, **2014**); doi:10.1117/12.2045432; **http://dx.doi.org/10.1117/12.2045432**
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36. **Fudala R**, Rich R, Mukerjee A, Ranjan AP, Vishwanatha JK, Kurdowska AK, Gryczynski Z, Borejdo J, Gryczynski I. Fluorescence Detection of MMP-9. II. Ratiometric FRET-Based Sensing With Dually Labeled Specific Peptide. Current Pharmaceutical Biotechnology. **(2013):** 14(13): 1134 - 1138.
37. Seo J-T, Raut S, Abdel-Fattah M, Rice Q, Tabibi B, Rich R, **Fudala R**, Gryczynski I, Gryczynski Z,Kim W-J, Jung S, Hyun R. Time-resolved and temperature-dependent photoluminescence of ternary and quaternary nanocrystals of CuInS2 with ZnS capping and cation exchange. J. Appl. Phys. 114, 094310 **(2013)**; doi: 10.1063/1.4820269
38. Brooks MM, Neelam S, **Fudala R**, Gryczynski I, Cammarata PR. Lenticular mitoprotection. Part A: Monitoring mitochondrial depolarization with JC-1 and artifactual fluorescence by the glycogen synthase kinase-3β inhibitor, SB216763. Mol Vis. **(2013)** Jun 27;19:1406-1412.
39. Maliwal BP, **Fudala R**, Raut S, Kokate R, Sørensen TJ, Laursen BW, Gryczynski Z Gryczynski I. Long-lived bright red emitting azaoxo-triangulenium fluorophores. PLoS One. **(2013)** May 7;8(5):e63043.
40. Rich RM, Mummert M, Gryczynski Z, Borejdo J, Sørensen TJ, Laursen BW, Foldes-Papp Z, Gryczynski I, **Fudala R**. Elimination of autofluorescence in fluorescence correlation spectroscopy using the AzaDiOxaTriAngulenium (ADOTA) fluorophore in combination with time-correlated single-photon counting (TCSPC). Anal Bioanal Chem. **(2013)** May;405(14):4887-94. doi: 10.1007/s00216-013-6879-0.
41. Rich RM, Mummert M, Gryczynski Z, Borejdo J, Gryczynski I, Sørensen TJ, Laursen BL, **Fudala R**. Detection of hyaluronidase activity using fluorescence lifetime correlation spectroscopy to separate diffusing species and eliminate autofluorescence. **(2013)** SPIE BiOS. 859003-12.
42. Midde K, Rich R, Marandos P, **Fudala R**, Li A, Gryczynski I, Borejdo J. Comparison of Orientation and Rotational Motion of Skeletal Muscle Cross-Bridges Containing Phosphorylated and de-Phosphorylated Myosin Regulatory Light Chain. **(2013)**. J. Biol. Chem. Mar 8;288(10):7012-23. doi: 10.1074/jbc.M112.434209. Epub 2013 Jan 14.
43. Chib R, Raut S, **Fudala R**, Chang A, Mummert M, Rich R, Gryczynski Z, Gryczynski I FRET based Ratio-metric Sensing of Hyaluronidase in Synthetic Urine as a Biomarker for Bladder and Prostate Cancer. **(2013)**. Curr Pharm Biotechnol. 14:470-474. DOI: 10.2174/13892010113149990222
44. Krupa A, **Fudala R**, Florence JM, Tucker T, Allen TC, Standiford TJ, Luchowski R, Fol M, Rahman M, Gryczynski Z, Gryczynski I, Kurdowska AK. Bruton’s tyrosine kinase mediates FcγRIIa / TLR4 receptor cross-talk in human neutrophils. American Journal of Respiratory Cell and Molecular Biology; **(2013)**, Feb;48(2):240-9. doi: 10.1165/rcmb.2012-0039OC.
45. Rich RM, Stankowska DL, Maliwal BP, Sørensen TJ, Laursen BW, Krishnamoorthy RR, Gryczynski Z, Borejdo J, Gryczynski I, **Fudala R**. Elimination of autofluorescence background from fluorescence tissue images using time-gated detection and the AzaDiOxaTriAngulenium (ADOTA) fluorophore. Analytical and Bioanalytical Chemistry; **(2013)**, Feb;405(6):2065-75. DOI: 10.1007/s00216-012-6623-1.
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49. Seo J, **Fudala R**, Kim W-J, Rich R, Tabibi B, Cho H, Gryczynski Z, Gryczynski I, Yu W. Hybrid optical materials of plasmon-coupled CdSe/ZnS coreshells for photonic applications. Opt Mater Express. **(2012)** Aug 1;2(8):1026-1039.
50. Arabski M, **Fudala R**, Koza A, Wasik S, Futoma-Koloch B, Bugla-Ploskonska G, Kaca W. The presence of anti-LPS antibodies and human serum activity against Proteus mirabilis S/R forms in correlation with TLR4 (Thr399Ile) gene polymorphism in rheumatoid arthritis. Clin Biochem. **(2012)** Nov;45(16-17):1374-82. doi: 10.1016/j.clinbiochem.2012.06.021.
51. Dibas A, Jiang M, Clark A.F, **Fudala R**, Gryczynski I, Gryczynski Z, Yorio T. Characterization of trafficking of RFP-GRα and EGFP-GRβ steroid receptor translocation in a transformed human trabecular meshwork cell-line. IVOS **(2012)**, May 17;53(6):2938-50.
52. Folmar M, Shtoyko T, **Fudala R**, Akopova I, Gryczynski Z, Raut S, Gryczynski I. Metal Enhanced Fluorescence of Me-ADOTA+ by Silver Triangular Nanoprisms on a Gold Film. Chemical Physics Letters **(2012)**. 531:126–131.
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