Silas J. Leavesley

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Dept. of Chemical and Biomolecular Engineering
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Education

Ph.D. Biomedical Engineering, Purdue University, West LafayetBT 0 g4-8.,T(e)4 (nt94 0 Tn1c)-7 oce

Led a multi-disciplinary team to develop hyperspectral imaging equipment for Kodak Corporation. Modeled and prototyped calibration phantoms for small animal fluorescence imaging. Performed research in advanced microscopy techniques including hyperspectral, high-resolution, and darkfield imaging. Developed methods for growing and imaging bovine aortic endothelial cells under shear conditions. Designed and patented a novel macroscopic and microscopic imaging endoscope.

Advisor: Dr. Pedro E. Arce

Other accomplishments: Graduated cum laude and with Honors in the Major.

International Baccalaureate (I.B.) degree, James S. Rickards High School, Tallahassee, FL 32301 1994-1998

International Baccalaureate is an internationally recognized degree of secondary education. Received 34 hours of college credit for advanced high

Instructor, Chemical and Biomolecular Engineering, University of South Alabama, Mobile, AL (2008)

Graduate Teaching Assistant, Purdue University, West Lafayette, IN

Early Career Reviewer Program, Center forScientific Review, NIH (2015)

This program selects outstanding early career stage investigators to serve on standing study sections at NIH.

Ronald W. Dollens Graduate Scholarship, Purdue University, West Lafayette, IN, 47907 (2007)

Awarded to fund outstanding graduate students in biomedical engineering and industrial pharmacy.

Integrative Graduate Education and Res

Naga Annamdevula (M.S., University of South Alabama, 2012):

Zi Xiu Wang (B.S., University of South Alabama, 2010): + R Q R U G H U J U D G X D W H 7 K H V L V A model for FRET efficiencies in varying cellular microenvironments and equipment configurations

Molly Fu (B.S., Purdue, 2007): 2 years of undergraduate research.

Jasmin Nwachokor (B.S., Texas A&M, 2009): Summer undergraduate research.

Mark Koivuniemi (Park Tudor High School, Indianapolis, 2006): * O R E D O 6 F K R O D U ¶ V 3

Proposals Funded (Reverse Chronological Order)

1. Thomas Rich (PI), Silas Leavesley (Co-PI), Mark Taylor (Co-I), Zeiss LSM 980 Airyscan confocal microscope, NIH: S10OD028606 (6/15/2020-6/14/2021). $600,000 (plus cost share)
2. Na Gong (PI), Shenghua Zha (Co-PI), Silas Leavesley

13.

Stevens

11. Yuanyuan Xu, Yu-Qing Jiang, Ce Li, Midi He, W. George Rusyniak, Naga Annamdevula, Juan Ochoa, Silas J Leavesley, Jiangping Xu, Thomas C Rich, Mike T Lin1, Xiang-ming Zha. Human ASIC1a mediates stronger acid-induced responses as compared to mouse ASIC1a. FASEB Journal 32, 3832-3843 (2018). PMCID: PMC5998965
12.

5. Sean Mobilia, Birsen Sirkeci-Mergen, Joshua Deal, Thomas C. Rich, Silas J. Leavesley. Classification of hyperspectral colon cancer images using convolutional neural networks. IEEE Signal Processing Society, Proc. DSW, 1077 (2019).
6. Craig M. Browning, Mayes Samuel, Joshua Deal, Arslan Arsh, Samantha Gunn Mayes, Marina Parker, Thomas C. Rich, and Silas J. Leavesley. Sensitivity Analysis of a Multibranched Light Guide for Real Time Hyperspectral Imaging Systems. Proc. SPIE 10871, Multimodal Biomedical Imaging XIV, 1087107 (2019)
7. Silas J Leavesley, John Robert Griswold, Joshua Deal, Kathleen McAlister, Sam Mayes, Craig Browning, Marina Parker, Samantha G M Mayes, and Thomas C. Rich. Hyperspectral Imaging Fluorescence Excitation Scanning (HIFEX) Microscopy for Live Cell Imaging. Proc. SPIE 10883, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXVI, 108831A (2019)
8. Samantha Gunn Mayes, Samuel A Mayes, Craig Browning, Marina Parker, Thomas C Rich, and Silas J Leavesley. A Spherical Mirror-Based Illumination System for Fluorescence Excitation-Scanning Hyperspectral Imaging. Proc. SPIE 10881, Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues, 108810N (2019)
9. Marina Parker, Craig M. Browning, Thomas C. Rich, and Silas J. Leavesley. Optimization of Light Transmission through an Excitation-Scan Hyperspectral Mirror Array System. Proc. SPIE 10881, Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XVII , 108810O (2019)
10. Thomas C Rich, J. R. Griswold, Joshua Deal, Nagarjun Aamdevula, Kathleen McAlister, Samuel Mayes, Craig Browning, Marina Parker, and Silas J Leavesley. Hyperspectral Imaging Microscopy for Measurement of Localized Second Messenger Signals in Single Cells. Proc. SPIE 10881, Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XVII, 108811F (2019)
11. Joshua Deal, Thomas C Rich, and Silas J Leavesley. Optimizing Channel Selection for Excitation-Scanning Hyperspectral Imaging. Proc. SPIE 10881, Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XVII, 108811B (2019)
12. Joshua Deal, Stuart J McFarland, Anna Robinson, Anna Alford, David Weber, Thomas C Rich, and Silas J Leavesley. Hyperspectral Imaging Fluorescence Excitation Scanning Spectral Characteristics of Remodeled Mouse Arteries. Proc. SPIE 10890, Label-free Biomedical Imaging and Sensing (LBIS) 2019, 108902M (2019)
13. Craig M. Browning, Samuel Mayes, Thomas C. Rich, Silas J. Leavesley. Endoscopic hyperspectral imaging: light guide optimization for spectral light source coupling. Proc. SPIE 10487, Multimodal Biomedical Imaging XIII, 104870H (2018)
14. Joshua Deal, Bradley Harris, Will Martin, Malvika Lall, Carmen Lopez, Paul Rider, Carole Boudreaux, Thomas Rich, Silas J. Leavesley. Demystifying autofluorescence with excitation scanning hyperspectral imaging. Proc. SPIE 10497, Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XVI, 1049715 (2018)
15. Silas J. Leavesley, Joshua Deal, Shante Hill, Will A. Martin, Malvika Lall, Carmen Lopez, Paul F. Rider, Thomas C. Rich, and Cole W. Boudreaux. Colorectal cancer detection by hyperspectral imaging using fluorescence excitation scanning. Proc. SPIE 10489, Optical Biopsy XVI: Toward Real-Time Spectroscopic Imaging and Diagnosis, 104890K (2018)
16. Sam A. Mayes, Kaysie Moore, Craig Browning, Phiwat Klomkaew, Thomas C. Rich, Silas J. Leavesley. Applications and assessment of an excitation scanning hyperspectral imaging

system. Proc. SPIE 10497, Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XVI, 1049706 (2018)

17. Malvika Lall, Joshua Deal, Shante Hill, Paul F. Rider, Carole W. Boudreaux, Thomas C. Rich, Silas Leavesley. Classification of normal and lesional colon tissue using fluorescence excitation-scanning hyperspectral imaging as a method for early diagnosis of colon cancer. Proc. NCUR 1275 (2017)

18. Craig M. Browning, Samuel Mayes, Thomas C. Rich, Silas J. Leavesley. Design of a modified endoscope illuminator for spectral imaging of colorectal tissues. Proc. SPIE 1006015 (2017)

19. Silas J. Leavesley, Brenner Sweat, Tyna Abbott, Peter F. Favreau, Naga S. Annamdevula, Thomas C. Rich. Comparing methods for analysis of biomedical hyperspectral image data. Proc. SPIE 100680S (2017)

20. Joshua Deal, Peter F. Favreau, Carmen Lopez, Malvika Lall, David S. Weber, Thomas C. Rich, Silas J. Leavesley. Excitation scanning hyperspectral imaging as a means to discriminate various tissues types. Proc. SPIE 10068 16 (2017)

21.

2017) ning hyperspectral imaging as a means t

endothelial cell (PMVEC) barrier permeability. Proc. SBEC, Journal of the Mississippi Academy of Science, 60:S1 211-216 (2015).

30. Peter F. Favreau, Thomas C. Rich, Ashley Stringfellow, Diego Alvarez, Prashant Prabhat, Silas J. Leavesley. An excitation scanning hyperspectral microscope for biomedical imaging of GFP in highly autofluorescent lung tissue. Proc. SBEC, Journal of the Mississippi Academy of Science, 59:S1 (2014)

31. Naga S. Annamdevula, Andrea Britain, Thomas C. Rich, Silas J. Leavesley. Hyperspectral FRET imaging and analysis approaches to determine cAMP compartmentalization in PMVECs. Proc. SBEC, Journal of the Mississippi Academy of Science, 59:S1 (2014)

32. Kristal J. Webb, Silas J. Leavesley, Thomas C. Rich. A quantitative evaluation of FRET based cAMP measurements. Proc. SBEC, Journal of the Mississippi Academy of Science, 59:S1 (2014)

33. Birsen Sirkeci, Mallika Sridharan Keralapura, Serena Coelho, Silas Leavesley, Thomas C. Rich. Linear unmixing of hyperspectral images for analysis of fluorescently labeled cells with imperfect endmember spectra. Proc. ISBI 683 (2013)

34. Peter F. Favreau, Thomas C. Rich, Prashant Prabhat, Silas J. Leavesley. Tunable thin optical filters for hyperspectral microscopy. Proc. SPIE 8578 (2013)

35. Samuel H. Russ, Viswakalyan Perepa, Silas Leavesley, Bret Webb. Novel low-cost salinity sensor for embedded environmental monitoring. Proc. of the IEEE Southeastcon 55-56 (2010)

36. Silas Leavesley, J. Paul Robinson. A calibrated tissue phantom for small animal fluorescen,n93CID-

silica substrates. Materials Research Society Symposium D Proceedings 1009 50 (2007)

43. Silas Leavesley, Wamiq Ahmed, Bulent Bayraktar, Bartek Rajwa, Jennifer Sturgis, J. Paul Robinson. Multispectral imaging analysis: spectral deconvolution and applications in biology. Proc. SPIE 5699 121 (2005)

Professional Conference Presentations

Cyto (International Conference of ISAC), Vancouver, BC, Canada (2019)

Joshua Deal, Thomas C. Rich, Silas J. Leavesley. Hyperspectral Imaging Fluorescence Excitation Scanning (HIFEX) Microscopy for Detection of Calcium Signals in Single Cells

Southern Biomedical Engineering Conference, SBEC, New Orleans, LA (2015)

Joshua Deal, Thomas Rich, Silas Leavesley. Optimizing channel selection for calcium signaling using excitation-scanning hyperspectral imaging

Marina Parker, Craig M. Browning, Samantha Gunn Mayes, Thomas C. Rich, Silas J. Leavesley. Light transmission optimization through an excitation-scan hyperspectral multi-lens and mirror array system

Frontiers in Imaging Science II (Selected Oral Presentation), Janelia Research Institute, Ashburn, VA (2019)

Silas J. Leavesley. Enhancing high-speed and live-cell microscopy through fluorescence excitation-scanning spectral imaging

The International Society for Optics and Photonics (SPIE), Photonics West, San Francisco, CA (2019)

Craig M. Browning, Mayes Samuel, Joshua Deal, Arslan Arshad, Samantha Gunn Mayes, Marina Parker, Thomas C. Rich, and Silas J. Leavesley. Sensitivity Analysis of a Multibranched Light Guide for Real Time Hyperspectral Imaging Systems

Silas J. Leavesley, John Robert Griswold, Joshua Deal, Kathleen McAlister, Sam Mayes, Craig Browning, Marina Parker, Samantha Gunn Mayes, and Thomas C. Rich. Hyperspectral Imaging Fluorescence Excitation Scanning (HIFEX) Microscopy for Live Cell Imaging

Samantha Gunn Mayes, Samuel A. Mayes, Craig Browning, Marina Parker, Thomas C. Rich, and Silas J Leavesley. A Spherical Mirror-Based IT Q q6.85 T2 Tf 291.65 255.6n BT /TT0 12 Tfre TT0

Td [(a)4 (af 90)]TJ ET Q q 0 0 612 792 EMC O /P <</MCID 13 >>BDC q 0 0 612 792 re * nJ E 222 792 r[(, n 1TT

Cyto (International Conference of ISAC), Prague, Czech Republic (2018).

C. Browning, S. Mayes, T. Rich and S. Leavesley, Developing Spectral Imaging Approaches for Autofluorescence Analysis for Endoscopic Applications

J. Icha, S. Leavesley, J. Nedbal and R. Errington, Workshop 14: Photobleaching and Phototoxicity in Live Cell Imaging

S. Leavesley, N. Annamdevula, J. R. Griswold, A. Britain, R. Penn and T. Rich, Improving the Accuracy of Spectral FRET Measurements Using Enhanced Spectral Selection for 5 Dimensional FRET Imaging

J. Deal, J. Griswold, N. Annandevula, T. Rich and S. Leavesley, Effects of Spectral Bandwidth on Spectral Imaging FRET Measurements

American Thoracic Society (ATS), Washington, D.C. (2017).

Thomas C. Rich, Nag

TC Rich, NS Annamdevula, J Deal, AL Britain, K Trinh, C Hoffma

NanoBio Summit, Atmore, AL (2017)

Silas J. Leavesley, "Molecular Imaging of Cells and Tissues Using Spectral Imaging Approaches."

Kristal J. Webb, C. Alex Wiles, Naga Annamdevula, Rachel Sweat, Andrea L. Britain, V. Anh Phan, Mary I. Townsley, Silas J. Leavesley, and Thomas C. Rich, A mathematical model of calcium and cAMP signaling in pulmonary microvascular endothelial cells

The International Society for Optics and Photonics (SPIE), Photonics West, San Francisco, CA (2016)

Silas J. Leavesley, Mikayla Wheeler, Carmen Lopez, Thomas Baker, Peter F. Favreau, Thomas C. Rich, Paul F Rider, Carole W. Boudreaux, Hyperspectral imaging fluorescence excitation scanning for detecting colorectal cancer: pilot study

Craig M. Browning, Samuel Mayes, Peter Favreau, Thomas C. Rich, Silas J. Leavesley, LED-based endoscopic light source for spectral imaging

Peter F. Favreau, Joshua A. Deal, David S. Weber, Thomas C. Rich, Silas J. Leavesley. Feasibility for detection of autofluorescent signatures in rat organs using a novel exeitation scanning hyperspectral imaging system

Samuel A. Mayes, Silas J. Leavesley, Thomas C. Rich, Excitation-scanning hyperspectral imaging system for microscopic and endoscopic applications

Thomas C. Rich, Naga Annamdevula, Andrea L. Britain, Samuel Mayes, Peter F. Favreau, and Silas J. Leavesley, Three dimensional measurement of cAMP gradients using hyperspectral confocal microscopy

International Society for the Advancement of Cytometry (ISAC), CYTO 2015, Glasgow, UK (2015)

Peter F. Favreau, Lauren K. Cichon, Diego F. Alvarez, Thomas C. Rich, Prashant Prabhat, Silas J. Leavesley, Mapping spectral signatures of matrix components in decellularized lungs using excitation-scanning hyperspectral imaging

Silas J. Leavesley, Naga Annamdevula, Andrea Britain, Thomas Rich, and Arie Nakhmani Analysis of subcellular second messenger signaling events using spectral FRET microscopy and image cytometry approaches

Michael Halter, Silas Leavesley, Stephen Lockett, Ask the experts: quality control in image cytometry

American Thoracic Society (ATS), National Conference, Denver, CO (2015)

Thomas C. Rich, Naga S. Annamdevula, Peter Favreau, Andrea L. Britain, M., Arie Nakhmani and Silas J. Leavesley, Hyperspectral imaging and image analysis approaches applied to FRET-based measurements of cAMP signals in pulmonary microvascular endothelial cells

Southern Biomedical Engineering Conference, SBEC, New Orleans, LA (2015)

Naga S. Annamdevula, Andrea Britain, Thomas C. Rich, Silas J. Leavesley, Role of PDE4 isoforms in regulating cAMP compartmentalization and pulmomary microvascular endothelial cell (PMVEC) barrier permeability

Peter F. Favreau, Lauren Cichon, Diego Alvarez, Thomas C. Rich, Silas J. Leavesley, Excitation scanning hyperspectral imaging of autofluorescence in decellularized rat lungs

Samuel Mayes, Silas J. Leavesley, Thomas C. Rich, Hyperspectral illumination device for microscopic and endoscopic applications

Erin Lowrey, G.Todd Hamlin, Silas Leavey, vi

Peter F. Favreau, Thomas C. Rich, Ashley Lindsey, Diego Alavarez, Prabhat Prashant, Silas J. Leavesley A thin-film tunable filter system for excitation- and emission-scanning hyperspectral imaging of lung tissue

Clarissa Hernandez, Tiffany Heaster, Peter Favreau, Thomas C. Rich, Silas J. Leavesley Assessing the effectiveness of thin-film tunable filters for hyperspectral imaging microscopy

International Society for the Advancement of Cytometry, CYTO 2013, San Diego, CA (2013)

Silas J. Leavesley, Andrea Britain, Thomas C. Rich. Automated intracellular FRET measurements using hyperspectral microscopy and feature extraction

Peter Favreau, Thomas C. Rich, Ashley Stringfellow, Diego A. Alvarez, Prashant Prabhat, Silas J. Leavesley The feasibility of using tunable thin-film optical filters for excitation- or emission-scanning hyperspectral microscopy

American Chemical Society (ACS), National Conference, New Orleans, LA (2013)

Lauren Cichon, Diego Alvarez, Thomas Rich, Silas Leavesley Evans blue conjugated to albumin as a tracer for the identification of leak sites and quantification of injury within the lungs

American Thoracic Society (ATS), National Conference, Denver, CO (2013)

Thomas C. Rich, Andrea L. Britain, M. Audi Byrne, Diego Alvarez and Silas J. Leavesley Hyperspectral imaging approaches applied to FRET-based measurements of localized cAMP signals in pulmonary endothelial cells

A. Stringfellow, N. Annamdevula, P. Favreau, S. Leavesley, D. Alvarez

American Institute of Chemical Engineers (AIChE), National Conference, Minneapolis, MN (2011)

Naga Srilakshmi Annamdevula, Silas J. Leavesley, Thomas C. Rich, Diego F. Alvarez and Ashley Stringfellow. Comparison of hyperspectral wide-field and confocal fluorescence microscopic techniques

International Society for the Advancement of Cytometry, CYTO 2011, Baltimore, MD (2011)

Silas J. Leavesley, Naga Annamdevula, Samantha Stocker, Diego A. Alvarez, Thomas C. Rich Ex vivo analysis of pulmonary microvascular endothelial cells using spectral confocal microscopy and

American Institute of Chemical Engineers (AIChE), National Conference, Philadelphia, PA (2008)

Biomedical Engineering Society (BMES), Chicago, IL (2006)

Silas J. Leavesley, Jianming Jiang, Mary-Margaret Seale, Rachel Schek, Jennifer A. McCann Brown, Andrew O. Brightman. Integrating concepts in transport phenomena with biomedical applications in the laboratory

Photonics West (SPIE), San Jose, CA, 95113 (2005)

Silas J. Leavesley, Wamiq Ahmed, Bulent Bayraktar, Bartek Rajwa, Jennifer Sturgis, J. Paul Robinson. Multispectral imaging analysis: spectral deconvolution and applications in biology

Other Presentations and Publications

Industrial Publications

1. Silas Leavesley, Bartek Rajwa, J. Paul Robinson, Edward Freniere, Richard Hassler, Linda Smith. A Fluorescent Phantom for Small Animal Imaging. Biophotonics International (2007) Journal Front Cover.

Seminars

1. Seeing New Colors in Medicine. Phi Kappa Phi Scholar of the Year Presentation (2019)
2. Approaches for molecular analysis of cells and tissues using spectral imaging. USA Pulmonary Research Conference (2016).
3. Feasibility of Hyperspectral Imaging Fluorescence Excitation Scanning for Colon Cancer Detection. Abraham Mitchell Cancer Research Forum (2015).
4. Real-Time Hyperspectral Imaging for Identification of Colon Cancer. Abraham Mitchell Cancer Research Forum (2014).
5. Spectral Imaging and Automated Image Analysis: What Can They Do For CMB? USA Pulmonary Research Conference (2013)
6. Design and Application of Spectral Imaging Systems for Microscopic and Macroscopic Biomedical Studies. Chemical and Biomedical Engineering Seminar Series, Florida State University, Tallahassee, FL (2011)
7. Biochemical Modeling and Imaging. AIChE Mobile Pascagoula Section Meeting, Mobile, AL (2011)
8. Design and Application of Spectral Imaging Systems for Microscopic and Macroscopic Biomedical Studies. Mitchell Cancer Institute Seminar Series, University of South Alabama (2011).
9. Spectral Imaging and Biomedical Optics for Disease Detection. College of Engineering Graduate Colloquium Seminar, University of South Alabama, Mobile, AL (2009)
10. Spectral Methods for Microscopic and In-Vivo Imaging. Cell Signaling Seminar Series, University of South Alabama, AL (2008)
11. Applications of multispectral imaging in biology and biomedical engineering. Summer seminar series, Biomedical Engineering, Purdue University, West Lafayette, IN (2006)

Courses Taught

CHE 311: Equilibrium Stage Operations, Chemical and Biomolecular Engineering, University of South Alabama, Mobile, AL 36688

Semesters taught: Fall 2008, Fall 2009, Fall 2010, Spring 2012, Spring 2013, Spring 2014, Spring 2015, Spring 2016

Equilibrium stage operations is the study of equilibrium-limited separation processes, such as flash separations, liquid-liquid extraction, and distillation. Principles of thermodynamics, material balances, and engineering design are combined to model ideal scenarios for these separation processes.

CHE 342: Engineering Communications, Chemical and Biomolecular Engineering, University of South Alabama, Mobile, AL 36688

Semesters taught: Spring 2011, Fall 2011, Fall 2012, Fall 2013, Fall 2014

This undergraduate course focuses on key aspects of written and oral communication. This class incorporates both lecture and interactive components (peer revision, discussion, etc.). In each class meeting there is usually one-to-several team-oriented in-class exercises. Students complete term a term research project that includes both a written and an oral component. Students also complete written and oral laboratory reports. Additional writing assignments include résumés and cover letters. Students apply a revision process that students should be easily able to apply to many types of technical and research writing (D. Ellis, The Research Proposition. Chemical Engineering Education 29, 222 (1995)). Practical elements of efficient technical writing are also emphasized, such as reference databases and the use of styles sheets when outlining a technical report

CHE 352: Process Measurement Lab IE83 Tm 0 g 0 G [(s)9(6is)9(6is)9(6is)9(6is)9(6is)9(6is)9(6is)9

Chair ± Image Cytometry Parallel Session ± ISAC), 2013

Workshop Chair ± Spectral Imaging and Tissue Cytometry Workshop ± ISAC), 2013

Chair ± Cytometry Technology: Image Cytometry ± ISAC), 2012

Senior Lecturer ± Fundamental Optics and Basic Digital Microscopy ± Congress Course ± ISAC), 2012

Judge,

Faculty Search Committee, Chemical and Biomolecular Engineering, University of South Alabama, Mobile, AL (2010-2011)

College of Engineering Webpage Committee (ad hoc), University of South Alabama, Mobile, AL (2010-2011)

Department Graduate Committee, Chemical and Biomolecular Engineering, University of South Alabama, Mobile, AL (2008-2010)

Chair ± Promotions Committee, Purdue Graduate Student Government, West Lafayette, IN, 47907 (2005-2007)

BME Representative, Purdue Graduate Student Government, West Lafayette, IN, 47907 (2004-2007)

Leadership Board for founding the Biomedical Engineering Graduate Student Association, Purdue University, West Lafayette, IN, 47907 (2006)

Community Service

B.E.A.C.H.E.S. Program, University of South Alabama, Mobile, AL 36688 (2010) ± Developed and taught the Bio-Engineering And Chemical Engineering Summer Program, a summer outreach program for local area high school SBAf 0 G [( )] TJ ETW* n BT /F2 12 Tf 1 0 0 1