

# Standard Vita Required by the Department of Biological Science

(Completion of category preceded by asterisk is required.)

## William H. Outlaw Jr.

### \*I. ADDRESS

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Tallahassee, FL 32306-4370

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### II. EDUCATION AND DEGREES

Officer Basic Course for Field Artillery, U.S. Army, Captain (highest rank, USAR)  
Ph.D., Department of Botany, University of Georgia

### \*III. FELLOWSHIPS

NDEA IV

### \*IV. ACADEMIC AND RESEARCH POSITIONS (Chronological)

Research Associate, Department of Biochemistry, Michigan State University (1974-75)  
Research Instructor, Department of Pharmacology, Washington University (1975-77)  
Assistant Professor, Department of Biology, Washington University (1977-80)  
Associate Professor, Department of Biological Science, Florida State University (1980-85)  
Professor, Florida State University (1985-2001)  
(plus research visits at Kettering Research Institute (Ohio, 1979), Erasmus University (Rotterdam, 1979), Technical University of Munich (1984), Karls Eberhardt University (Tübingen, 1985, 1999))  
Peter H. Homann Professor of Biological Science, Florida State University (2001-present)

### \*V. PROFESSIONAL HONORS & BIOGRAPHICAL LISTINGS

Humboldt Prize (1985)  
Senior Technical Advisor Recruit (STAR), United Nations (1991)  
University Teaching Awards (1994, 1999)  
SUS Teaching Incentive Program Award (1994, 1999)  
Ellias Teaching Award (1995)  
Distinguished Service Award, Southern Section of the American Society of Plant Physiologists (1998)

\*VI. PROFESSIONAL SOCIETIES, OFFICES (Note term of office)

Secretary/Treasurer of Southern Section of the American Society of Plant Physiologists (1985-86)  
Vice Chairman of Southern Section of the American Society of Plant Physiologists (1986-87)  
Chairman of Southern Section of the American Society of Plant Physiologists (1987-88)  
Member, Executive Committee, Southern Section of the American Society of Plant Physiologists (1988-91, 1993-96)  
Member, Executive Committee, American Society of Plant Physiologists (1989-92 (at large), 1993-96, appointed substitute, 1999)  
Numerous committees—see Section XVI

VII. SCIENTIFIC MEETINGS COMMONLY ATTENDED

Recent presentations by PI and associates of work conducted in PI's laboratory:

- Outlaw WH Jr. 2002 The effects of different traditional processing methods on the metal contents of sugar cane syrup. NSSPPA, Bowling Green, KY INVITED PRESENTATION
- Meng FX, Outlaw WH Jr, Du, Z, Aghoram K, Riddle KA 2002 The role of cytosolic alkalization in the regulation of phosphorylation of guard-cell phosphoenolpyruvate carboxylase. SS/American Society of Plant Biologists, University of Georgia (Athens, GA)
- Sherdan DM, Outlaw WH Jr 2002 Identification of a potential H<sup>+</sup>-sucrose symporter in guard cells of *Vicia faba*. SS/American Society of Plant Biologists, University of Georgia (Athens, GA)
- Outlaw WH Jr. 2002 Teaching update: Thumbnail sketch of stomatal movements. SS/American Society of Plant Biologists, University of Georgia (Athens, GA)
- Outlaw WH Jr 2002 Transpiration and guard-cell apoplastic solutes. Biochemistry and Biotechnology Division, SAAS, Orlando INVITED PRESENTATION
- Outlaw WH Jr 2000 Guard-cell chloroplasts. Society for Experimental Biology, Exeter University (UK) INVITED PRESENTATION
- Outlaw WH Jr 2000 The use of individually dissected cells in plant-cell biology. Society for Experimental Biology, Exeter University (UK) INVITED PRESENTATION
- Aghoram K, Outlaw WH Jr, Bates GW, Cairney J, Levenson CW 1999 Identification of a novel abscisic acid-regulated gene from guard cells of *Vicia faba* L. Annual Meeting of the American Society of Plant Physiologists (Baltimore, MD)
- Outlaw WH Jr 1999 An update on stomatal regulation. Botanic Garden of Pisa (Italy) INVITED PRESENTATION
- Outlaw WH Jr. 1999 The guard-cell apoplast. Universität Tübingen (Germany) INVITED PRESENTATION
- Outlaw WH Jr 1999 Unique roles of the guard-cell wall in the regulation of plant gas exchange. Der Apoplast der höhern Pflanze (DFG-sponsored meeting), Jülich (Germany) INVITED PRESENTATION
- Outlaw WH Jr 1999 Unique roles of the guard-cell wall in the regulation of plant gas exchange. Universität Heidelberg (Germany) INVITED PRESENTATION

- Hebert RD, Outlaw WH Jr, Aghoram K, Lumsden AS, Riddle KA, Hampp R 1998 Visualization of Mycorrhizal Fungi. Annual Meeting of the Association for Biology Laboratory Educators (ABLE), Tallahassee, FL
- Pearson MN 1998 The dynamics of starch concentration and the role of sucrose in guard cells of *Vicia faba* L. Undergraduate Honors Thesis Defense, FSU
- Popova L 1998 Fluridone- and light-affected chloroplast ultrastructure and ABA accumulation in drought-stressed *Vicia faba* and barley plants. XIth International Congress on Photosynthesis, Budapest (Hungary) INVITED PRESENTATION
- Outlaw WH Jr 1998 The mechanism of stomatal movements with an emphasis on the role of sucrose. Tropical Research and Education Center, Homestead, FL invited presentation
- He X 1998 The effect of external relative humidity on sucrose accumulation in guard cells of *Vicia faba* L. M.S. Thesis Defense, FSU
- Du Z 1997 Guard-cell phosphoenolpyruvate carboxylase. Regulation by phosphorylation and selected physiological aspects of the signal-transduction network. Ph.D. Dissertation Defense, FSU
- Du Z, K Aghoram, WH Outlaw Jr 1997 *In vivo* phosphorylation of PEPC in guard cells is enhanced by FC and suppressed by ABA. Annual Retreat of the UF Plant Cell and Molecular Biologists, Marineland, FL
- Aghoram K, Z Du, WH Outlaw Jr 1997 *In vivo* phosphorylation of PEPC in guard cells is enhanced by FC and suppressed by ABA. Annual Meeting of the Southern Section of the American Society of Plant Physiologists, Tuskegee, AL GRADUATE STUDENT AWARD
- Aghoram K, Z Du, WH Outlaw Jr 1997 *In vivo* phosphorylation of PEPC in guard cells is enhanced by FC and suppressed by ABA. Annual Meeting of the American Society of Plant Physiologists, Vancouver (Canada)
- Z Du, K Aghoram, WH Outlaw Jr 1997 Selected aspects of the signal transduction pathway in regulation of the phosphorylation of PEPC during FC-induced stomatal opening. Annual Meeting of American Society of Plant Physiologists. Vancouver (Canada)
- Outlaw WH Jr. 1997 Stomata. University of Missouri, Columbia, MO INVITED PRESENTATION
- Outlaw WH Jr. 1997 Regulatory phosphorylation of guard-cell phosphoenolpyruvate carboxylase. Workshop on Plant Protein Phosphorylation. Jackson Hole, WY INVITED PRESENTATION

#### VIII. REFEREE ACTIVITIES (Papers and grant proposals)

Peer Review Panelist for Federal Competitive Grants Programs (1983, 1984, 1986, 1989 (3x), 1991)  
 Many other grants on *ad hoc* basis

#### IX. SUMMER AND SABBATICAL ACTIVITIES [BLANK]

\*X. EDITORIAL BOARDS (State, National, and International Professional Activities)

*What's New in Plant Physiology* (1982-85)

*Plant Physiology* (1981-92)

XI. RESEARCH INTERESTS

Research-interests summary: <http://mailer.fsu.edu/~woutlaw/who.html>

\*XII. SOURCES OF FUNDS FOR RESEARCH

| <u>Country</u> | <u>Agency</u> | <u>Dates</u>                            |
|----------------|---------------|---|
| U.S.           | NSF           | 1976-89, 1992-94 (multiple, concurrent) |
| New Zealand    | DSIR          | 1978                                    |
| U.S.           | NIH           | 1979                                    |
| United Kingdom |               | 1979                                    |
| F. R. Germany  | DFG           | 1978, 1981, 1983 (multiple)             |
| Belgium        | IRSIA         | 1981, 1982, 1989-1990                   |
| U.S.           | DOE           | 1981-2002 (continuous)                  |
| Italy          |               | 1983-84                                 |
| U.S.           | USDA          | 1985, 1992-1996, 1999-2002              |
| ---            | NATO          | 1990                                    |
| ---            | UN            | 1991                                    |
| ---            | NASA          | pending                                 |
| China          | CSC           | 1998-1999                               |

\*XIII. GRADUATE STUDENTS AND POSTDOCTORAL ASSOCIATES

(Past graduates: last known position and research interest)

(Present students: research interest, final degree and expected date of graduation)

Past

|               |  |
|---------------|--|
| C. Willmer    | Professor (retired), University of Sterling              |
| P. Minchin    | —, DSIR  |
| G. Kirst      | Professor, University of Bochum                          |
| J. Croxdale   | Professor, University of Wisconsin                       |
| R. Hampp      | Chair, University of Tübingen                            |
| P. Brown      | Product Development, Kraft                               |
| G. Martin     | Research Assistant Professor, University of Nebraska     |
| M. Bodson     | Professor, University of Liège                           |
| J. Veech      | Research Plant Physiologist (retired), USDA              |
| F. Callahan   | Research Scientist, USDA                                 |
| C. Faraday    | Cornell University (last known)                          |
| S. Springer   | Entrepreneur, Mobile, AL                                 |
| M. Güttenberg | Assistant Professor, University of Tübingen (last known) |
| G. Bedini     | Scientist/Curator, Botanic Garden, Pisa                  |

### XIII. GRADUATE STUDENTS AND POSTDOCTORAL ASSOCIATES (Continued)

|               |  |
|---------------|--|
| L. Shen       | Associate Professor, China Agricultural University (last known)    |
| M. Harris     | Retired, U.C. Riverside  |
| M. Tarczynski | Research Manager, Trait and Technology Development, Pioneer Hibred |
| S. Zhang      | Professor and Department Chair, China Agricultural University      |
| X. Wang       | Professor, China Agricultural University                           |
| L. Popova     | Director, Biochemistry and Photosynthesis, Bulgarian Acad. Sci     |
| M. Espelund   | Student, University of Oslo (last known)                           |
| Z. Liu        | unknown (did not complete degree)                                  |
| D. Hite       | Assistant Professor, Truman State University                       |
| J. deBedout   | Scientific Products Representative, Atlanta, GA                    |
| P. Lu         | Computer analyst, San Diego, CA                                    |
| Z. Du         | Computer Programmer, State of Florida                              |
| K. Zhou       | unknown (did not complete degree)                                  |
| H. He         | Greenville, SC (working and student)                               |
| G. Li         | Professor, Southwest Agricultural University, China                |
| K. Aghoram    | Research Associate, North Carolina State University                |

#### Present

|            |                 |               |
|------------|-----------------|---------------|
| Y. Kang    | 3d Year Student | Ph.D. student |
| F. Meng    | 3d Year Student | Ph.D. student |
| D. Sherdan | 2d Year Student | Ph.D. student |
| T. Jiang   | 2d Year Student | M.S. student  |

### \* XIV. HONORS AND UNDERGRADUATE RESEARCH STUDENTS (at FSU, past 10 years)

|                         |                        |
|-------------------------|------------------------|
| Jason Griffin (present) | T. Ballinger (2001-02) |
| K. Temkit (1998-99)     | D. Sherdan (1998-99)   |
| D. Sakole (1998)        | R. Hebert (1998)       |
| M. Pearson (1996-98)    | P. Crampton (1997)     |
| G. Freed (1995-96)      | M. Ewert (1993-94)     |
| K. McWhorter (1992)     | C. King (1992)         |
| A. Thompson (1990-91)   |                        |

### \*XV. MAJOR LECTURE AND LABORATORY COURSES TAUGHT AT FSU

Teaching philosophy: [http://mailer.acns.fsu.edu/~woutlaw/Teaching\\_Philosophy.html](http://mailer.acns.fsu.edu/~woutlaw/Teaching_Philosophy.html)

APB 1150 (General Biology for Non-majors)

BSC 1105L (General Biology Laboratory for Non-majors)—**Current Rotation**

Tutorial on Fungi for Teaching Assistants:

<http://bio.fsu.edu/~outlaw/Fungi1005L/Attributes%20of%20Fungi/IntroPage.htm>

Tutorial on Plants for Teaching Assistants under construction:

<http://mailer.acns.fsu.edu/~woutlaw/Plant/IntroPage.htm>

XV. MAJOR LECTURE AND LABORATORY COURSES TAUGHT AT FSU, continued

APB 2010 (Biological Processes)

BOT 2013C (Plant Diversity Lab)

BOT 3503 (Introductory Plant Physiology)

BOT 3503L (Introductory Plant Physiology Lab)

BOT 4503 (Plant Physiology)—**Current Rotation**

Syllabus, course objectives, and lecture notes:

anonymous ftp site (Computer IP: 128.186.14.75)

BOT 5505 (Plant Biochemistry and Molecular Biology)

BSC 3402L (Experimental Biology Laboratory)—**Current Rotation**

Syllabus, lecture notes, and protocols:

<http://mailer.acns.fsu.edu/~woutlaw/CONTEN97.html>

BOT 3015 (Introductory Plant Biology)—**Current Rotation**

Syllabus, course objectives, sample exam questions, and lecture notes:

anonymous ftp site (Computer IP: 128.186.14.75)

BOT 3015L (Introductory Plant Biology Laboratory)—**Current Rotation**

Syllabus, lecture notes, and protocols:

anonymous ftp site (Computer IP: 128.186.14.75)

\*XVI. SERVICE (since coming to FSU)

Departmental

|         |   |
|---------|---|
| 1982-83 | Member, Space Committee<br>Member, Greenhouse Committee<br>Chairman, Faculty Search Committee   |
| 1983-84 | Coordinator, Genetics and Cell Biology Area Group<br>Chairman, Genetics and Cell Biology Area Curriculum Committee<br>Member, Graduate Policy Council<br>Member, Greenhouse Committee |
| 1984-85 | Member, Faculty Evaluation Committee  |
| 1985-86 | Member, Executive Committee<br>Member, Academic Affairs Committee<br>Chairman, <i>ad hoc</i> Committee  |
| 1986-87 | Member, Academic Affairs Committee  |
| 1987-88 | Member, Academic Affairs Committee  |
| 1988-89 | Member, Academic Affairs Committee<br>Member, Faculty Evaluation Committee  |
| 1989-90 | Member, Academic Affairs Committee  |
| 1990-91 | Member, Academic Affairs Committee<br>Chairman, Faculty Evaluation Committee  |
| 1991-92 | Member, Academic Affairs Committee  |
| 1992-93 | Member, Academic Affairs Committee<br>Member, Grade Appeals Committee<br>Coordinator, Genetics and Cell Biology Area  |
| 1993-94 | Member, Academic Affairs Committee  |

Member, Grade Appeals Committee  
 Member, Promotion and Tenure Committee  
 1994-95 Member, Academic Affairs Committee  
 Member, Grade Appeals Committee  
 1995-96 Member, Promotion and Tenure Committee  
 Member, Academic Affairs Committee  
 Member, Elections Committee  
 1996-97 Member, Academic Affairs Committee  
 Member, Elections Committee  
 Member, TIP Evaluation Committee  
 Coordinator, Cell Biology Area  
 Member, Faculty Search Committee  
 Member, Faculty Evaluation Committee  
 1997-98 Member, Academic Affairs Committee  
 Member, Promotion and Tenure Committee  
 Chairman, Faculty Evaluation Committee  
 1998-99 Member, Academic Affairs Committee  
 1999-2000 Member, Academic Affairs Committee  
 2000-2001 Coordinator, Departmental Colloquium  
 Member, Academic Affairs Committee  
 Member, Elections Committee  
 2001-2002 Coordinator, Departmental Colloquium  
 Member, Academic Affairs Committee  
 Member, Graduate Policy Committee  
University  
 1982-83 Member, Property Survey  
 Member, Faculty Senate  
 1983-84 Member, Property Survey Committee  
 NSF/ACE Plant Biology Manpower Study (FSU)  
 1984-85 Member, Property Survey Committee  
 1990-92 Faculty Senate  
 1990-91 Graduate Policy Committee  
 Member, *ad hoc* committee to evaluate Program in Education Administration  
 1992-93 Member, Graduate Policy Committee  
 Member, *ad hoc* committee to evaluate Program in Reading Education  
 Member, Educational Programs Committee  
 Member, Admissions Committee  
 1993-94 Member, Graduate Policy Committee  
 Member, Admissions Committee  
 Member, ISC Asst Director Search Committee  
 Member, Dissertation Sequestration Discussion Group  
 Member, Admissions Committee  
 1994-95 Member, Admissions Committee

XVI. SERVICE (since coming to FSU), continued

- 1995-96 Member, Admissions Committee  
1997-98 Member, Admissions Committee  
1998-99 Member, Admissions Committee  
1999-2000 Member, Admissions Committee  
Member, Library Committee  
Member, Collections Sub-committee (Library Committee)  
2000-2001 Member, Admissions Committee  
Member, Search Committee, Library, Head of Reference  
Member, Search Committee, Library, Assistant Head of Circulation  
2001-2002 Member, Board of Directors, Friends of the Library  
Member, Membership Committee, Friends of the Library  
Member, Admissions Committee  
2002-2003 Member, Promotion and Tenure Committee, Science Area  
Member, Promotion and Tenure Committee, College of Arts and Sciences  
Society (also see VI)  
1983-84 Site Host, SS/ASPP (at FSU Conference Center)  
1985-86 Site Selection Committee, ASPP  
1986-87 Chairman, Site Selection Committee, SS/ASPP  
1987 Symposium Organizer, International Botanical Congress  
1988-89 Chairman, Nominations Committee, SS/ASPP  
1989-91 Member, Nominations Committee, SS/ASPP  
1991-92 Member, Site Selection Committee, SS/ASPP  
1996-97 Member, Constitution and Bylaws Committee, ASPP  
1997-98 Member, Constitution and Bylaws Committee, ASPP  
Member, Graduate Student Judging Committee, SS/ASPP  
1998-99 Chairman, Constitution and Bylaws Committee, ASPP  
1999-2000 (Substitute) Regional Representative to ASPP

Public Relations

- 1984 Botanical Delegate to Republic of South Africa (People-to-People International)  
1989 Delegation Leader, Plant Biochemist Group to China (People-to-People International)

XVII. POPULAR RECOGNITION (Newspapers, magazines, TV, radio, etc.) [BLANK]

XVIII. MISCELLANEOUS INFORMATION [BLANK]

\* XIX. PUBLICATIONS

Asterisk preceding entry indicates that publication was refereed.

\*Outlaw WH Jr, DB Fisher 1975 Compartmentation in *Vicia faba* leaves. I Kinetics of <sup>14</sup>C in the tissues following pulse labeling. Plant Physiol 55: 699-703



- \*Outlaw WH Jr, DB Fisher, AL Christy 1975 Compartmentation in *Vicia faba* leaves. II Kinetics of  $^{14}\text{C}$ -sucrose redistribution among individual tissues following pulse labeling. *Plant Physiol* 55: 704-711
- \*Outlaw WH Jr, DB Fisher 1975 Compartmentation in *Vicia faba* leaves. III Photosynthesis in the spongy and palisade parenchyma. *Aust J Plant Physiol* 2: 435-439
- \*Outlaw WH Jr, CL Schmuck, NE Tolbert 1976 Photosynthetic carbon metabolism in the palisade parenchyma and spongy parenchyma of *Vicia faba* L. *Plant Physiol* 58: 186-189
- \*Lowry OH, SJ Berger, MM Chi, JG Carter, A Blackshaw, WH Outlaw Jr 1977 Diversity of metabolic patterns in human brain tumors.—I High energy phosphate compounds and basic composition. *J Neurochem* 29: 959-977
- \*Jones MGK, WH Outlaw Jr, OH Lowry 1977 Enzymic assay of  $10^{-7}$  to  $10^{-14}$  moles of sucrose in plant tissues. *Plant Physiol* 60: 379-383
- \*Outlaw WH Jr, OH Lowry 1977 Organic acid and potassium accumulation in guard cells during stomatal opening. *Proc Natl Acad Sci* 74: 4434-4438
- \*Outlaw WH Jr, J Kennedy 1978 Enzymic and substrate basis for the anaplerotic step in guard cells. *Plant Physiol* 62: 648-652
- Outlaw WH Jr 1978 Biochemical analysis of single plant cells. *WNPP* 9: 21-24
- \*Outlaw WH Jr, OH Lowry 1979 Measurement of  $10^{-7}$  to  $10^{-12}$  mol of potassium by stimulation of pyruvate kinase. *Anal Biochem* 92: 370-374
- \*Outlaw WH Jr, J Manchester 1979 Guard cell starch concentration quantitatively related to stomatal aperture. *Plant Physiol* 64: 79-82
- \*Outlaw WH Jr, J Manchester, CA DiCamelli 1979 Histochemical approach to properties of *Vicia faba* guard cell phosphoenolpyruvate carboxylase. *Plant Physiol* 64: 269-272
- \*Fisher DB, WH Outlaw Jr 1979 Sucrose compartmentation in the palisade parenchyma of *Vicia faba* L. *Plant Physiol* 64: 481-483
- \*Outlaw WH Jr, J Manchester, CA DiCamelli, DD Randall, B Rapp, GM Veith 1979 Photosynthetic carbon reduction pathway is absent in chloroplasts of *Vicia faba* guard cells. *Proc Natl Acad Sci* 76: 6371-6375
- Outlaw WH Jr 1980 A descriptive evaluation of quantitative histochemical methods based on pyridine nucleotides. *Ann Rev Plant Physiol* 31: 299-311
- \*Outlaw WH Jr, J Manchester 1980 Conceptual error in determination of  $\text{NAD}^+$ -malic enzyme in extracts containing  $\text{NAD}^+$ -malic dehydrogenase. *Plant Physiol* 65: 1136-1138

- Outlaw WH Jr 1981 Unique aspects of carbon metabolism in guard cells of *Vicia faba* L. In CA Rogers, ed, Integrated View of Guard Cells, Symposium Series of the Southern Section of the American Society of Plant Physiologists
- \*Outlaw WH Jr, BC Mayne, VE Zenger, J Manchester 1981 Presence of both photosystems in guard cells of *Vicia faba* L. Implications for environmental signal processing. *Plant Physiol* 67: 12-16
- \*Outlaw WH Jr, J Manchester, VE Zenger 1981 The relationship between protein content and dry weight of guard cells and other single cell samples of *Vicia faba* L. leaflet. *Histochem J* 13: 292-336
- Jones MGK, WH Outlaw Jr 1981 Enzymic assay for sucrose. *Techniques in Carbohydrate Metabolism*. B 302: 1-8
- \*Outlaw WH Jr, J Manchester, PH Brown 1981 High levels of malic enzyme activities in *Vicia faba* L. epidermal tissue. *Plant Physiol* 68: 1047-1051
- \*Outlaw WH Jr, J Manchester, VE Zenger 1982 Potassium involvement not demonstrated in stomatal movements of *Paphiopedilum*. Qualified confirmation of the Nelson-Mayo report. *Can J Bot* 60: 240-244
- Outlaw WH Jr 1982 Carbon metabolism in guard cells. *Recent Adv Phytochem* 17: 185-222
- \*Outlaw WH Jr, MC Tarczynski, LC Anderson 1982 Taxonomic survey for the presence of ribulose 1,5-bisphosphate carboxylase activity in guard cells. *Plant Physiol* 70: 1218-1220
- \*Hampp R, WH Outlaw Jr, MC Tarczynski 1982 Profile of basic carbon pathways in guard cells and other cells of *Vicia faba* L. *Plant Physiol* 70: 1582-1585
- \*Brown PH, WH Outlaw Jr 1982 Effect of fusicoccin on dark  $^{14}\text{CO}_2$  fixation by *Vicia faba* guard cell protoplasts. *Plant Physiol* 70: 1700-1703
- \*Vaughn KC, WH Outlaw Jr 1983 Cytochemical and cytofluorometric evidence for guard cell photosystems. *Plant Physiol* 71: 420-424
- \*Michel BE, OK Wiggins, WH Outlaw Jr 1983 A guide to establishing water potential of aqueous two-phase solutions (polyethylene glycol + dextran) by amendment with mannitol. *Plant Physiol* 72: 60-65
- \*Croxdale JG, WH Outlaw Jr 1983 Glucose-6-phosphate dehydrogenase activity in the shoot apical meristem, leaf primordia, and leaf tissues of *Dianthus chinensis* L. *Planta* 157: 289-297
- Outlaw WH Jr 1983 Current concepts on the role of potassium in stomatal movements. *Physiol Plant* 59: 302-311
- Outlaw WH Jr, SA Springer 1983 'Malic' enzyme. *Methods of Enzymatic Analysis III*: 176-183

- \*Outlaw WH Jr, MC Tarczynski 1984 Guard cell starch biosynthesis regulated by effectors of ADP-glucose pyrophosphorylase. *Plant Physiol* 74: 424-429
- \*Outlaw WH Jr, MC Tarczynski, WI Miller 1984 Histological compartmentation of phosphate in *Vicia faba* L. leaflet—possible significance to stomatal functioning. *Plant Physiol* 74: 430-433
- \*Martin GE II, WH Outlaw Jr, LC Anderson, SG Jackson 1984 Photosynthetic electron transport in guard cells of diverse species. *Plant Physiol* 75: 336-337
- Outlaw WH Jr, MC Tarczynski 1984 Sucrose. *Methods of Enzymatic Analysis VI*: 96-103
- \*Kaiser K, WH Outlaw Jr, H Ziegler 1985 Sucrose content of receptive archegonia of the moss *Bryum capillare* Hedw. *Naturwissenschaften* 72: 378-379
- \*Outlaw WH Jr, SA Springer, MC Tarczynski 1985 Histochemical technique. A general method for quantitative enzyme assays of single cell extracts with a time resolution of seconds and a reading precision of femtomoles. *Plant Physiol* 77: 659-666
- Outlaw WH Jr, SA Springer, MC Tarczynski 1985 Enzyme assays at the single-cell level: Real-time, quantitative, and using natural substrate in solution. In RL Heath, J Preiss, eds, *Regulation of Carbon Partitioning in Photosynthetic Tissue*. American Society of Plant Physiologists, pp 161-179
- \*Bodson M, WH Outlaw Jr 1985 Elevation in the sucrose content of the shoot apical meristem of *Sinapis alba* at floral evocation. *Plant Physiol* 79: 420-424
- \*Kaiser K, DF Gaff, WH Outlaw Jr 1985 Sugar contents of leaves of desiccation-sensitive and desiccation-tolerant plants. *Naturwissenschaften* 72: 608-609
- Outlaw WH Jr 1987 A minireview: Comparative biochemistry of photosynthesis in palisade cells, spongy cells, and guard cells of C<sub>3</sub> leaves. *Progress in Photosynthesis Research IV.5*. 265-272
- Outlaw WH Jr 1987 An introduction to carbon metabolism in guard cells. In E Zeiger, G Farquhar, I Cowan, eds, *Stomatal Function*. Stanford University Press (Stanford, CA), pp 115-123
- Hampp R, WH Outlaw Jr 1987 Mikroanalytik in der pflanzlichen Biochemie. *Naturwissenschaften* 74: 431-438
- \*Hampp R, WH Outlaw Jr, H Ziegler 1987 Quantitative histochemical analysis of starch, malate and K<sup>+</sup>, together with the activity of phosphoenolpyruvate carboxylase along an elongating primary leaf of *Hordeum vulgare*. *Z Naturforsch* 42C: 1092-1096
- \*Tarczynski MC, WH Outlaw Jr 1987 Histochemical technique: Densitometry of nanogram quantities of proteins separated in one-dimensional microslab gels. *Plant Physiol* 85: 1059-1062

- \*Harris MJ, WH Outlaw Jr, R Mertens, EM Weiler 1988 Water-stress-induced changes in the abscisic acid content of guard cells and other cells of *Vicia faba* L. leaves as determined by enzyme-amplified immunoassay. Proc Natl Acad Sci USA 85: 2584-2588
- \*Outlaw WH Jr, DRC Hite, GB Fiore 1988 Removal of contaminating nucleoside diphosphates from commercial preparations of uridine diphosphoglucose. Anal Biochem 171: 104-107
- \*Steingraber M, WH Outlaw Jr, R Hampp 1988 Subcellular compartmentation of fructose 2,6-bisphosphate in oat mesophyll cells. Planta 175: 204-208
- \*Springer SA, WH Outlaw Jr 1988 Histochemical compartmentation of photosynthesis in the crassulacean acid metabolism plant *Crassula falcata*. Plant Physiol 88: 633-638
- \*Tarczynski MC, WH Outlaw Jr, N Arold, V Neuhoff, R Hampp 1989 Electrophoretic assay for ribulose 1,5-bisphosphate carboxylase/oxygenase in guard cells and other leaf cells of *Vicia faba* L. Plant Physiol 89: 1088-1093
- Outlaw WH Jr 1989 Critical examination of the quantitative evidence for and against photosynthetic CO<sub>2</sub> fixation by guard cells. Physiol Plant 77: 275-281
- \*Shen L, WH Outlaw Jr 1989 Two-dimensional protein profiles of palisade parenchyma and of spongy parenchyma of *Vicia faba* leaf. Physiol Plant 77: 599-605
- Hampp R, A Rieger, WH Outlaw Jr 1990 Microdissection and biochemical analysis of plant tissues. In HF Linskens, JK Jackson, eds, Modern Methods of Plant Analysis New Series, Vol. 11, Springer-Verlag, pp 124-147
- \*Outlaw WH Jr 1990 Potential importance of metal-ligand interactions in enzyme assays demonstrated with the assay cocktail for phosphoenolpyruvate carboxylase. Plant Physiol 92: 528-530
- Harris MJ, WH Outlaw Jr 1990 Histochemical technique: A low-volume, enzyme-amplified immunoassay with sub-fmol sensitivity. Application to measurement of abscisic acid in stomatal guard cells. Physiol Plant 78: 495-500
- \*Tarczynski MC, WH Outlaw Jr 1990 Partial characterization of guard-cell phosphoenolpyruvate carboxylase: kinetic datum collection in real time from single-cell activities. Arch Biochem Biophys 280: 153-158
- Outlaw WH Jr 1990 Kinetic properties of guard-cell phosphoenolpyruvate carboxylase. Biochem Physiol Pflanzen 186: 317-325
- \*Harris MJ, WH Outlaw Jr 1991 Rapid adjustment of guard-cell abscisic acid levels to current leaf-water status. Plant Physiol 95: 171-173

- \*Huber JL, DRC Hite, WH Outlaw Jr, SC Huber 1991 Inactivation of highly activated spinach leaf sucrose-phosphate synthase by dephosphorylation. *Plant Physiol* 95: 291-297
- \*Bodson MJ, WH Outlaw Jr, SH Silvers 1991 Malate content of picoliter samples of *Raphanus sativus* cytoplasm. *J Histochem Cytochem* 39: 435-440
- \*Zhang SQ, DRC Hite, WH Outlaw Jr 1991 Modification required for abscisic acid microassay (enzyme-amplified ELISA). *Physiol Plant* 83: 304-306
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\*Aghoram K, WH Outlaw Jr, SQ Zhang, FX Meng, CW Levenson (In Revision, pending 1 experiment) Expression characteristics of *abg1*, a gene up-regulated by ABA in guard cells and leaf of *Vicia faba* L., and analysis of the putative ABG1 protein.

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Outlaw WH Jr, BG Smith (In preparation, research completed) Metal contents of table syrups prepared by different traditional methods. (J Ecol Nutrition or Econ Bot)