

**Precision Forestry Cooperative (PFC) 07/09 Biennium
Accomplishments
(July 1, 2007 – Dec 4, 2008)**

Summary

Biennium Funding (\$2.224million)

- \$504,000 ATI
- \$200,000 Corkery Family Chair
- \$1,520,000 Grants received, not prorated
- Also, Scholarships, Fellowships, TA's and other student support

Graduate Students

- 6 Masters, 1 PhD graduated
- 3 Masters, 9 PhD in residence

Awards

- 4 professional meeting awards

Publications

- 4 journal articles, 17 proceedings articles and 3 reports in print plus 3 articles accepted and 5 in review
- 21 conference, symposium presentations and 14 posters
- 20 workshops and other presentations

Publications

A. Theses

1. **Clarkin, Tobey**, 2007. Modeling Global Navigation Satellite System Positional Error under Forest Canopy based on LIDAR-Derived Canopy Densities. MFR Thesis. College of Forest Resources, University of Washington, 99pp.
2. **Kim, Sooyoung** 2008. Individual tree species identification using LIDAR-derived crown structure and intensity data. . PhD Thesis. College of Forest Resources, University of Washington, 124pp.
3. **Cooke, Andrew**. 2008. Analysis of LiDAR-derived bare ground model accuracy in Southern California chaparral. Master of Science Thesis College of Forest Resources, University of Washington
4. **Richardson, Jeff**, 2008. Estimating Leaf Area Index from Aerial Discrete-return LIDAR at the Washington Park Arboretum. Master of Science Thesis College of Forest Resources, University of Washington
5. **Thienel, Gonzalo** 2008. Nondestructive evaluation of wood stiffness in standing Douglas-fir trees in Western Washington and Western Oregon. Master of Science Thesis College of Forest Resources, University of Washington, 125pp
6. **Sullivan, Alicia**. 2008. LIDAR Based Delineation in Forest Stands. Master of Science Thesis, College of Forest Resources, University of Washington, 82pp
7. **Strunk, Jacob**. 2008. Two-Stage Forest Inventory with LIDAR on the Ft. Lewis Military Installation. Master of Science Thesis, College of Forest Resources, University of Washington,

B. Journal Articles

1. Breidenbach, J., McGaughey, R., Andersen, H.E., Kändler, G., Reutebuch, S. 2007. **A mixed effects model to estimate stand volume by means of small footprint airborne lidar data for an American and German study site**. International Archives of Photogrammetry and Remote Sensing 36(3) W52: 77-83..
2. Breidenbach, J., McGaughey, R., Andersen, H.E., Kändler, G., Reutebuch, S. 2008. **Mixed-effects models for estimating stand volume by means of small footprint airborne laser scanner data**. Photogrammetric J. of Finland 21(1):4-15..
3. Andersen, H.-E.; R.J. McGaughey; and S.E. Reutebuch. 2008. **Assessing the influence of flight parameters, interferometric processing, slope and canopy density on the accuracy of X-band IFSAR-derived forest canopy height models**. International J. of Remote Sensing 29(5): 1495-1510.

4. Tóth, Sándor F., and Marc E. McDill 2008: **Promoting Large, Compact Mature Forest Patches in Harvest Scheduling Models**. *Environmental Modeling and Assessment* 13(1-15).

Accepted

1. Li, Y., H. E. Andersen, R.J. McGaughey. **A comparison of statistical methods for estimating forest biomass from LIDAR data**. *Western Journal of Applied Forestry*. Accepted.
2. Cherry, M.L., V. Vikram, D.G. Briggs, D.W. Cress, G.T. Howe. **Genetic variation in direct and indirect measures of wood stiffness in coastal Douglas-fir**. *Can. J. For. Res.*
3. **Tóth, S.F.** and M.E. McDill. **Finding Efficient Harvest Schedules under Three Conflicting Objectives**. *Forest Science*.

In review

1. Zheng, G. and L. M. Moskal. Retrieving leaf area index (LAI) based on remote sensing: theory, method and sensors. *Sensors*. Submitted Nov. 2008, *In Review*.
2. Kato, A., L. M. Moskal, P. Schiess, M. E. Swanson, D. Calhoun and W. Stuetzle. Capturing Crown Formation through Implicit Surface Reconstruction. *Remote Sensing of Environment*. Submitted: Oct. 2008, *In Review*.
3. Richardson, J. J., Moskal, L. M., Kim, S. 2008. Modeling approaches to estimate effective leaf area index from aerial discrete-return LiDAR. *Agricultural and Forest Meteorology*. Submitted Feb. 2008, *In Review*.
4. Sullivan, Alicia. **Lidar Based Stand Delineation in Natural Stands**. *Western Journal of Applied Forestry*
5. **Tóth, S.F.** , R.G. Haight, S.A. Snyder, S. George, J.R. Miller, M.S. Gregory and A.M. Skibbe. **Reserve Selection with Minimum Contiguous Area Restrictions: An Application to Open Space Protection Planning in Suburban Chicago**. *Biological Conservation*

C. Proceedings Articles

1. Erdody T. and L. M. Moskal. Application of LiDAR and Imagery for Estimating Canopy Fuel Metrics. *Proceedings of ASPRS 2009 Annual Conference, Baltimore, MD*, Submitted September 2008. Awaiting acceptance.
2. Moskal, L.M., T. Erdody, A. Kato, J. Richardson, G. Zheng and D. Briggs. Aerial and Terrestrial LiDAR Applications in Precision Forestry. *The First International Conference on LiDAR Technology and Remote Sensing Applications (LiDAR 2009)*, Jan 4-8, 2009, Harbin, China. Accepted.

3. Kato, A., Moskal, and Calhoun, D., 2007. **“Spatial Resolution Effect of Tree Parameters for Forest Fire Simulation.”**, Proceedings of ForestSAT07, Montpellier, France Nov. 2007
4. Kato, A., Moskal, L.M., Swanson, M.E., Schiess, P., and Calhoun, D., 2007. **“A Wrapped Surface Reconstruction Method of LIDAR Points to Identify Tree Crown Attributes”**, Proceedings of CRSS/ASPRS 2007 Fall Conference, Ottawa, Canada Nov. 2007
5. Briggs, D.G, G. Thienel, E. C. Turnblom, E. Lowell, D. Dykstra, R. J. Ross, X. Wang, P. Carter. 2008. **Influence of Thinning on Acoustic Velocity of Douglas-fir Trees in Western Washington and Western Oregon.** In R.J. Ross, X. Wang, B.K. Brashaw, eds. Proc. 15th International Symposium on Nondestructive Testing of Wood. Forest Products Society, Madison, WI. Pp113-124
6. Kato, A., Schiess, P., Sullivan, A., and Moskal, L.M. (2008) **“Mapping tree location and crown attributes using remotely sensed data.”** Proceedings of 1st IUFRO All-D3-Conference, Sapporo, Japan June 2008
7. Kato, A., Moskal, L.M., Swanson, M.E., Schiess, P., and Calhoun, D., (2008) **“New High-Resolution Field Surveying Methods for Validation of Crown Attributes from 3D Scanning Laser Data.”**, Proceedings of ASPRS 2008 Annual Conference, Portland, OR, April 2008
8. Kato, A., Moskal, L.M. and Calhoun, D., (2008) **“Reconstruction of 3D tree crown structure from LiDAR with color of aerial photos”** Proceedings of International LIDAR Mapping Forum 08, Denver, CO, Feb 2008
9. Sullivan, A. accepted. **LiDAR based stand delineation in dense natural stands.** Proceedings IUFRO All-D3 Conference Pathways to Environmentally Sound Technologies for Natural Resource Use, Sapporo, Japan. June 15-20, 2008
10. Tóth, Sándor F. **Using Spatial Tradeoffs to Build Consensus and to Value Non-Market Services in Forest Management.** In FORMATH Kobe 2007, The 7th Symposium on Forest Resource Management and Mathematical Modeling. Eds: Sasaki N. and A. Yoshimoto. Kobe 2007, Japan
11. Kim, Sooyoung, G.G. McGaughey, H.E. Andersen, G.F. Schreuder. **Individual tree species identification using LIDAR intensity data.** Proc. ASPRS 2008 Annual Conference. Portland, OR. April 2008
12. Strunk, Jacob, Reutebuch, Stephen, McGaughey Robert and Foster, Jeff (2008) **“LIDAR Inventory and Monitoring of a Complex Forest”**. Proceedings of ASPRS 2008 Annual Conference, Portland, OR, April 2008
13. Li, Y., 2008. A comparison of forest height prediction from FIA field measurement and LiDAR data via spatial model. Proceedings of 2008 Forest Inventory and Analysis

14. Li, Y., McGaughey, R., Andersen, H.E. Sensitivity examination of LiDAR-derived plot-level tree height to inaccurate field plot location and plot size through simulation study. Proceedings of 2009 ASPRS annual conference. Baltimore MD. Abstract accepted.
15. Moskal, L. M. & A. Kato, 2008. LiDAR tree Crown Segmentation. Submitted & accepted to the Proceedings of the 2008 annual American Society for Photogrammetry & Remote Sensing meeting in Portland OR, April-May 2008.
16. Richardson, J.J., Kim, S., & Moskal, L.M. 2008. Derivation of leaf area index from multiple return, small-footprint, aerial LiDAR in a heterogeneous mixed forest. ASPRS 2008 Annual Conference, Portland, OR, April 2008.
17. Zheng, G. & L. M. Moskal, 2008. Retrieving Leaf Area Index & Net Primary Productivity based on ground-based LiDAR & ASTER images. Submitted & accepted to the Proceedings of the 2008 annual International Society of Photogrammetry & Remote Sensing congress in Beijing, China, July 2008.

D. Books, Book Chapters

E. Technical Reports, Working Papers, etc.

1. Cherry, M.L., Howe, G.T., Briggs, D., Cress, D., Vikram, V. 2007. **Genetic Variation in Wood Quality in a Clonal Douglas-fir Seed Orchard**. PNWTIRC Report 26. Pacific Northwest Tree Improvement Research Cooperative, Oregon State University, Corvallis, OR. 11pp
2. Cherry, M.L., Vikram, V., **Briggs, D.**, Cress, D., Howe, G.T. 2007. **Genetic Variation in Direct and Indirect Measures of Wood Stiffness in Coastal Douglas-fir**. PNWTIRC Report 27. Pacific Northwest Tree Improvement Research Cooperative, Oregon State University, Corvallis, OR. 30pp
3. Tóth, S.F., G. Ettl and S.S. Rabotyagov 2008. ECOSEL: An Auction Mechanism for Forest Ecosystem Services. CINTRAFOR Newsletter Special Issue Devoted to ECOSEL.

Presentations at Conferences, Symposia, Workshops.

Oral Presentations

1. Briggs, D., G. Thienel, E. Turnblom, E. Lowell, D. Dykstra, R. Ross, X. Wang, P. Carter. 2007 **Influence of thinning on acoustic velocity of Douglas-fir trees in Western Oregon and Washington**. 15th International Symposium on Nondestructive Testing of Wood. Duluth MN. Sept 10-12.

2. Briggs, D.G, R. Kantavichai, G. Thienel, E. C. Turnblom, E. Lowell, D. Dykstra, R. J. Ross, X. Wang, P. Carter. **Non-destructive evaluation of wood quality in Douglas-fir trees and logs – a pathway toward sustainable forests.** 2007 IUFRO All Division 5 Conference, Taipei, Taiwan. Oct 29-Nov 7, 2007.
3. Marc E. McDill and Tóth, Sándor F.: **Does the size in ARM matter?.** 2007 INFORMS Annual Meeting, Forestry Applications, Seattle, Washington, (11/2/2007)
4. Moskal, L.M. **LiDAR Fundamentals, Part One and Part Two.** Site-scale Applications of LiDAR on Forest Lands in Washington, Center for Urban Horticulture, College of Forest Resources, Univ of Washington. Seattle, WA. Jan 3, 2008
5. Kato, A., Moskal, L.M., Swanson, M.E., Schiess, P., and Calhoun, D., (2008) **“New High-Resolution Field Surveying Methods for Validation of Crown Attributes from 3D Scanning Laser Data.”**, ASPRS 2008 Annual Conference, Portland, OR, April 2008
6. Kato, A., Moskal, L.M. and Calhoun, D., (2008) **“Reconstruction of 3D tree crown structure from LiDAR with color of aerial photos”** International LIDAR Mapping Forum 08, Denver, CO, Feb 2008
7. Sullivan, A. 2008. **LiDAR based stand delineation in dense natural stands. IUFRO All-D3 Conference** “Pathways to Environmentally Sound Technologies for Natural Resource Use, Sapporo, Japan June 15-20.
8. Tóth, Sándor F.: **Multi-Objective Optimization to Auction Forest Ecosystem**, Western Forest Economists 43rd Annual Meeting, Welches ,Oregon (5/7/2008)
9. Briggs, D. **Non-destructive prediction of product stiffness in Douglas-fir trees and logs: basic relationships and influence of growing conditions.** Annual Review of Research, University of Washington, College of Forest Resources, Seattle, WA. April 18, 2007.
10. Briggs, David, G. Thienel, E. Turnblom, E. Lowell, D. Dykstra, R.J. Ross, X. Wang, P. Carter. **Estimating Wood Stiffness Along the Tree-to-Product Chain: Tools, Relationships and Silvicultural Influences.** Current Research and Developments in Wood Stiffness and Other Key Properties Workshop. Western Forestry & Conservation Ass’n. Hilton Hotel Vancouver, Vancouver, WA. May 28, 2008.
11. Howe, Glenn, M. Cherry, V. Vikram, D. Briggs, D. Cress, D. Neale. **Genetics of Douglas-fir wood stiffness: Acoustic tools, bending stiffness, and Candidate gene markers.** Current Research and Developments in Wood Stiffness and Other Key Properties Workshop. Western Forestry & Conservation Ass’n. Hilton Hotel Vancouver, Vancouver, WA. May 28, 2008
12. Kim, Sooyoung, G.G. McGaughey, H.E. Andersen, G.F. Schreuder. Individual tree species identification using LIDAR intensity data. Proc. ASPRS 2008 Annual Conference. Portland, OR. April 2008

13. James, L. Undergraduate thesis development of mountain goat habitat utilizing geospatial techniques; McNair Scholars Conference-UW Campus, Seattle; May 2008
14. Tóth, S.F., R.G. Haight, S.A. Snyder, M. Gregory, A.M. Skibbe and J.R. Miller. Optimal Reserve Selection Subject To Contiguous Habitat Requirements. 2008 INFORMS Annual Meeting, Washington DC (10/12/2008)
15. Tóth, S.F., G. Ettl and L. Rogers: Multi-criteria Optimization to Auction Forest Ecosystem Services. 2008 INFORMS Annual Meeting, Washington DC (10/12/2008)
16. Tóth, S.F., R.G. Haight, S.A. Snyder, S. George, J.R. Miller, M. Gregory and A.M. Skibbe. Optimal Reserve Selection with Minimum Contiguous Area Restrictions. Autumn 2008 UW College of Forest Resources Faculty Research Forum, Seattle, Washington (11/17/2008)
17. Li, Y., 2008. A comparison of forest height prediction from FIA field measurement and LiDAR data via spatial model. 2008 Forest Inventory and Analysis Symposium. Park City, Utah. October 21-23, 2008.
18. Tóth, S.F., G. Ettl and S.S. Rabotyagov: How Much Would You Pay to Produce Forest Ecosystem Services? – An Auction. The 2008 Northwest Environmental Forum. Blaine, Washington (10/30/2008).
19. Tóth, S.F., G. Ettl and S.S. Rabotyagov: ECOSEL: Selling Forest Ecosystem Services – A Workshop and Mock Auction. The USDA Forest Service Northwest Research Station, Corvallis, Oregon (12/18/2008)
20. Tóth, S.F. and G. Ettl. An Auction Mechanism to Sell Forest Ecosystem Services. Invited Seminar at the October 17, 2008 Nisqually River Council Meeting. Longmire, Washington (10/17/2008).
21. Tóth, S.F., G. Ettl and S.S. Rabotyagov. An Auction-Based Funding Mechanism for Recreational Services in Washington State Forestlands. Invited Seminar at a Washington State Department of Natural Resources Advisory Meeting. Snoqualmie, Washington (11/13/2008).

Posters

1. Erdody, T.L. & L.M. Moskal. 2008. “Fusion of LiDAR and Imagery for Estimating Canopy Fuel Metrics in Eastern Washington Forests”, Pacific Coast Fire Conference, San Diego CA.
2. Kato, A., Schiess, P., Sullivan, A., and Moskal, L.M. (2008) “Mapping tree location and crown attributes using remotely sensed data.” Proceedings of 1st UIFRO All-D3-Conference, Sapporo, Japan June 2008
3. Erdody, T.L. & L.M. Moskal. 2008. “LiDAR Derived Forest Structure for Fire Modeling”, ASPRS 2008 Annual Conference, Portland OR. 4/30/08.

4. Moskal, L.M., 2008. LiDAR Applications in Precision Forestry. Submitted & accepted to the Proceedings of the 2008 annual American Society for Photogrammetry & Remote Sensing meeting in Portland OR, April-May 2008.
5. Frey, A.J., L. M. Moskal & J. Green. 2008. Topographic Mapping with Lidar: A Summary of an Undergraduate Geospatial Technician Internship. Submitted & accepted to the Proceedings of the 2008 annual American Society for Photogrammetry & Remote Sensing meeting in Portland OR, April-May 2008.
6. Zheng, G. & L. M. Moskal, 2008. Forest inventory characterization from ground based LiDAR. Submitted & accepted to the Proceedings of the 2008 annual American Society for Photogrammetry & Remote Sensing meeting in Portland OR, April-May 2008.
7. Erdody, T.L. & L.M. Moskal. (2008) "LIDAR Derived Forest Structure for Fire Modeling". Submitted & accepted to the Proceedings of the 2008 annual American Society for Photogrammetry & Remote Sensing meeting in Portland OR, April-May 2008.
8. Moskal, L.M., J. Richardson & S. Kim, 2008. Leaf Area Index derived from airborne & ground LiDAR. International LiDAR Forum 08, Denver, CO.
9. Kato, A., Moskal, L.M. and Calhoun, D., (2007) "Spatial Resolution Effect of Tree Parameters for Forest Fire Simulation.", ForestSAT07, Montpellier, France Nov. 2007
10. Kato, A., Moskal, L.M., Swanson, M.E., Schiess, P., and Calhoun, D., (2007) "A Wrapped Surface Reconstruction Method of LIDAR Points to Identify Tree Crown Attributes", CRSS/ASPRS 2007 Fall Conference, Ottawa, Canada Nov. 2007
11. Kato, A., Moskal, L.M., Schiess. P., (2007) "Capturing Crown Formation from Remotely Sensed Data", Society of American Foresters National Convention 2007, Portland, OR. Oct.2007
12. Moskal, L.M. and Kato, A., (2007) "New Segmentation Method to Capture Three Dimensional Tree Structure from LIDAR", Society of American Foresters National Convention 2007, Portland, OR. Oct. 2007
13. Richardson, J. J., Moskal, L. M., Kim, S. 2007. Derivation of leaf area index from multiple return, small-footprint, aerial LiDAR in a heterogeneous mixed forest. Society of American Foresters National Conference. Portland, OR.
14. Bura, R., L. M. Moskal, D. Paun & C. Ryan. SustainabilityRX: Bioenergy Innovations Using Remote Sensing & Market Assessment Tools. 29th Symposium on Biotechnology for Fuels & Chemicals, April 29th-May 2nd, 2007.

Remote Sensing and Geospatial Applications Laboratory (RSGAL) Factsheets

1. Moskal., L. M. and G. Zheng, 2008. Forest inventory and stem characterization from terrestrial LiDAR. Factsheet # 1. Remote Sensing and Geospatial Application Laboratory, University of Washington, Seattle, WA.
2. Zheng G. and L. M. Moskal, 2008. Leaf Area Index (LAI) from Terrestrial LiDAR. Factsheet # 2. Remote Sensing and Geospatial Application Laboratory, University of Washington, Seattle, WA.
3. Kato, A., L. M. Moskal., P. Schiess, M. Swanson, D. Calhoun and W. Stuetzel, 2008. LiDAR based tree crown surface reconstruction. Factsheet # 3. Remote Sensing and Geospatial Application Laboratory, University of Washington, Seattle, WA.
4. Erdody, T.L., and L. M. Moskal, 2008. LiDAR derived canopy fuel metrics for wildfire modeling. Factsheet # 4. Remote Sensing and Geospatial Application Laboratory, University of Washington, Seattle, WA.
5. James, L., L. M. Moskal, 2008. Spatiotemporal Analysis of Mountain Goat Habitat. Factsheet # 6. Remote Sensing and Geospatial Application Laboratory, University of Washington, Seattle, WA.
6. Richardson, J. J, L.M. Moskal, S. Kim, 2008. Estimating Urban Forest Leaf Area Index (LAI) from aerial LiDAR. Factsheet # 5. Remote Sensing and Geospatial Application Laboratory, University of Washington, Seattle, WA.

PFC Sponsored Workshops, Seminars, & Meetings

1. September 21 , 2007 - **The ASPRS Columbia River - Puget Sound Region Joint Technical Exchange**, Vancouver, WA, (Akira. Kato, Sooyoung Kim, L.M.Moskal)
2. November 30, 2007- **The first meeting of Puget Sound Region student chapter of ASPRS**, Seattle, WA (A. Kato, A. Sullivan, J. Strunk, and L.M.Moskal).
3. December 6, 2007. **Precision Forestry Cooperative Executive Board Meeting**. Washington Park Arboretum. Seattle, WA.
4. November 19, 2007 – **Developing Quantitative Decision Tools to Aid Forest Natural Resource Management**. Invited seminar at the Olympic Natural Resources Center. Forks, WA, (Sándor F. Tóth)
5. December 13, 2007. **Spatial Optimization in Natural Resources**. Invited seminar at the Department of Natural Resources, Olympia, Washington (Sándor F. Tóth)
6. December 12, 2007. **Multi-criteria Modeling Meeting** Port Blakely Tree Farms, Tumwater, WA (Sándor F. Tóth)

7. January 3, 2008. **Site-scale Applications of LiDAR on Forest Lands in Washington**, Center for Urban Horticulture, College of Forest Resources, Univ. of Washington. Seattle (50 attendees).
8. February 20, 2008. “**Multi-criteria optimization to auction forest ecosystem services**” Seminar. USFS PNWRS, Portland, OR (Sándor F. Tóth)
9. March 19, 2008 Geospatial Open Source & Remote Sensing meeting organized by L. M. Moskal and the Cascadia Users of Geospatial Open Source, University of Washington, Seattle.
10. April 18, 2008 CFR Centers Annual Research Review: Beyond Ground Surface Models: Ecological Applications of Terrestrial & Aerial LiDAR presentation given by L. M. Moskal.
11. April 28 - May 2, 2008 American Society of Photogrammetry and Remote Sensing 2008 Conference in Portland, OR. A special session on LiDAR in forestry applications was hosted by Precision Forestry Cooperative and organized by L.M. Moskal.
12. May 27, 2008. Workshop Sponsor. Wood Quality & Forest Management. Western Forestry & Conservation Ass’n. Hilton Hotel Vancouver, Vancouver, WA.
13. May 28, 2008. Workshop Sponsor. Current Research and Developments in Wood Stiffness and Other Key Properties Workshop. Western Forestry & Conservation Ass’n. Hilton Hotel Vancouver, Vancouver, WA.
14. May 29, 2008. PFC Executive Board Meeting. Seattle, WA
15. June 9, 2008. Landmark Ventures. Videoconference. Potential RFID applications in the forestry sector. D. Briggs, SMC/PFC staff, G. Cabochan, Ash Mehta
16. July 25, 2008. Landmark Ventures. Videoconference. Potential RFID applications in the forestry sector – follow-up to June 9 teleconference. D. Briggs, J. Fridley, G. Cabochan, Ash Mehta.
17. Aug 13, PFC JAVAD GPS training workshop for RSGAL students organized by L. M. Moskal and J. Strunk.
18. September 16, 2008 Ground based Lidar estimation of changes in Biomass and its distribution associated with silvicultural treatment by L. M. Moskal and G. Zheng.
19. September 17, 2008 Terrestrial LiDAR demo at the SMC meeting by L. M. Moskal and G. Zheng.
20. November 19, 2008. UW GIScience Speaker Series, L. M. Moskal hosted a presentation by Luke Rogers on Building the Washington State Parcel Database and Informing the Legislature with GIS - Retaining Working Forestlands, University of Washington.

AWARDS

1. "Best Presentation in Forestry Sponsored Sessions" award for INFORMS 2008. Lead Author: Sandor Toth, College of Forest Resources, University of Washington, Seattle, WA. Title: Optimal Reserve Selection Subject to Contiguous Habitat Requirements The award is based on technical merit and quality of presentation.
2. 'Dick Thomas Memorial Prize': student-paper competition award. Authors: Joowon Park, Finn Krogstad, and Jim Fridley. Title: Development of a Small Stream Mapping Method Considering Topographic and Spectral Information.2008 WA GIS conference sponsored by WA URISA(Urban and Regional Information Systems Association) May 5-7
3. Akira Kato received the Ta Liang Memorial Award (\$500 from American Society of Photogrammetry and Remote Sensing), May 2008
4. Akira Kato received the Paul, R. Wolf Memorial Scholarship (\$2,500 from American Society of Photogrammetry and Remote Sensing), May 2008

Research Grants

Title	PI's	Agency	Amount	Start Date	End Date
Designing Urban Open Space with Ecological and Economic Goals	Sandor F. Toth, Robert G. Haight and Stephanie Snyder	USDA Forest Service, Northern Research Station	\$20,000	10/1/2007	9/30/2009
Hight resolution LIDAR	Gerard Schreuder	US Forest Service, FIA	\$ 363,424	6/17/2004	6/16/2009
The Feasibility and Expected Performance of the ECOSEL Auction Mechanism to Evaluate and Sell Forest Ecosystem Services	Sandor F. Toth and Gregory Ettl	USDA National Research Initiative Competitive Grants Program: Managed Ecosystems	\$50,000	8/1/2008	7/31/2009
Lidar based stand delineation	Peter Schiess	US Bureau of Land Management	\$50,000	6/1/2007	9/30/2008
Non-destructive evaluation of wood quality in standing Douglas-fir trees and logs	David Briggs, Eini Lowell, Eric Turnblom, Bruce Lippke, Peter Carter	USFS RMRS AGENDA 2020	\$87,500	2/10/2005	12/30/2009
Fusion of LIDAR and Impagery for Estimating Canopy Fuel Metrics in Eastern Wasington Forests	L. Monika Moskal, Todd Erdody	US EPA Star Grant	\$37,000	9/1/2008	9/1/2009
SoCal IFSAR	Gerard Schreuder	US Forest Service	\$ 263,077	3/24/2005	7/31/2008
Modeling Global Navigation Satellite System Positional Error under Forest Canopy based on LiDAR-Derived Canopy Densities and its Application to L-Line Locations of LiDAR-Based Topographically-Derived Forest Center Lines	P. Schiess	WA DNR	\$ 52,730	4/1/2006	10/31/2007
Wetland Assessment	Monika Moskal	Nature Conservancy	\$ 32,485	7/1/2008	6/30/2009
Arboretum LAI	Monika Moskal & Soo Hyung Kim	UW Royalty Research Fund	\$28,727		6/30/2009
Ground-based LIDAR	Monika Moskal	UW Royalty Research Fund	\$ 130,000		6/30/2009
Forest Inventory Protocol	Monika Moskal, Sandor F. Toth	US Forest Service	\$ 55,240	7/23/2008	12/31/2010
Proposal for the University of Washington to Join the I/UCRC Center for Advanced Forest Systems (CAFS)	D. Briggs, R. Harrison, L. Monika Moskal, Sandor F. Toth, E. Turnblom	National Science Foundatium	\$ 350,000	1/1/2009	12/31/2013
Total			\$1,520,183		