

RESEARCH OVERVIEW



CURRENT WBC-FUNDED RESEARCH

CURRENT PROJECTS ORGANIZED PER SITE IN ALPHABETICAL ORDER.

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
AUBURN UNIVERSITY					
O-07-PE: UNDERSTANDING THE FUNDAMENTAL INFLUENCE OF WOOD EXTRACTIVES ON WOOD (new)					
AUBURN UNIVERSITY: S. Peresin S. Gururaja OREGON STATE: J. Nairn J. Simonsen VIRGINIA TECH: C. Frazier STUDENT: Diego Cuartas	IAB TC LEADS: Bob Breyer, Bakelite Bill Leggate, DAF <ul style="list-style-type: none"> • Arclin • Bakelite • DAF • Hexion • Oxiquim • WVCO 	10/27/2022	1/1/2023	Expected 12/31/2024	Year 1 / 2: \$53,206 Total-to-date: \$53,206 Expected Request: Year 2 / 2: \$55,000 (Spring 2024)
O-02-VI: MONITORING PHENOL FORMALDEHYDE AND WAX CONTENT WITH VIS/NIR SMARTPHONE TECHNOLOGY (new)					
AUBURN UNIVERSITY: B. Via STUDENT: Seth Adusei	IAB TC LEADS: Patrick Farrell, Freres <ul style="list-style-type: none"> • Arclin • Bakelite • DAF • Freres • Hexion • Oxiquim • WVCO 	10/27/2022	1/1/2023	Expected 12/31/2023	Year 1 / 1: \$10,500 Total-to-date: \$10,500 Expected Request: \$0
MICHIGAN STATE UNIVERSITY					
O-05-NE: A FUNDAMENTAL STUDY OF LIGNIN REACTION WITH FORMALDEHYDE (new)					
MICHIGAN STATE: M. Nejad & T. Wang STUDENT: Debnath Debkumar	IAB TC LEADS: Sudip Chowdhury, WVCO <ul style="list-style-type: none"> • Arclin • Hexion • Oxiquim • WVCO 	10/27/2022	11/1/2022	Expected 12/31/2023	Year 1 / 1: \$30,000 Total-to-date: \$30,000 Expected Request: \$0

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
SWEETWATER-21: INVESTIGATING LIGNIN CONSISTENCY FROM BATCH-TO-BATCH					
MICHIGAN STATE: M. Nejad STUDENT: Mohsen Siahkamari	IAB TC LEAD: Scott Tudman, Sweetwater* <ul style="list-style-type: none"> Sweetwater* Hexion WVCO <i>*Former member</i>	10/14/2021	11/1/2021	Expected 10/31/2022	Year 1 / 1: \$35,000 Total-to-date: \$35,000 Expected Request: \$0
M-05-NE: IMPROVING DURABILITY OF WOOD PRODUCTS BY REDUCING LIGNIN DEGRADATION					
MICHIGAN STATE: M. Nejad STUDENT: Saeid Nikafshar, PhD Dyllan Nelson, B.S. Mariia Bespalova, Ph.D.	IAB TC LEAD: Sudip Chowdhury, WVCO <ul style="list-style-type: none"> LP Oxiquim WVCO 	8/27/20	11/1/20	Expected 11/30/22	Year 1 / 2: \$20,000 Year 2 / 2: \$20,000 Total-to-date: \$40,000 Expected Request: \$0

OREGON STATE UNIVERSITY					
BOISE-22: USING NOTCH DELAMINATION TO STUDY MOISTURE-ADHESIVE INTERACTIONS (new)					
OREGON STATE: A. Sinha J. Nairn STUDENT: Samuel Ayeni, MS. Elizabeth Israel, MS.	IAB TC LEAD: Danny Way, Boise <ul style="list-style-type: none"> Boise Freres 	10/27/2022	11/1/2022	Expected 2024	Year 1 / 2: \$56,000 Total-to-date: \$56,000 Expected Request Year 2 / 2: \$51,000 (Spring 2024)
O-09-SC: NEAR-INFRARED HYPERSPECTRAL IMAGING AND CHEMOMETRIC TECHNIQUES FOR ESTIMATION OF PERCENT WOOD FAILURE (PWF) IN ADHESIVE BONDS (new)					
OREGON STATE: L. Schimleck L. Muszynski STUDENT: TBD	IAB TC LEAD: Darren Riedlinger, Arclin <ul style="list-style-type: none"> Arclin Bakelite Boise Freres DAF Hexion Oxiquim 	10/27/2022	11/1/2022	Expected 2023	Year 1 / 1: \$7,108 Total-to-date: \$7,108 Expected Request: \$0

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
N-02-MU: LONG-TERM RESPONSE OF WOOD-BASED COMPOSITES IN VARIABLE CLIMATE CONDITIONS					
OREGON STATE: L. Muszynski J. Nairn M. Riggio STUDENT: Oluwafunbi Adeleye, MS	IAB TC LEAD: Patrick Farrell, Freres <ul style="list-style-type: none"> LP Freres WVCO Bakelite Oxiquim 	10/14/2021	11/1/2021	Expected 10/31/2023	Year 1 / 2: \$55,000 Year 2/2: \$55,000 Total-to-date: \$110,000 Expected Request \$0
M-03-PR: PRELIMINARY INVESTIGATION OF DMDHEU-TREATED STRAND BOARD					
OREGON STATE: F. Kamke G. Presley STUDENT: Hanna Gired, BS Shane Johnson, BS	IAB TC LEAD: Jesse Paris, WVCO <ul style="list-style-type: none"> LP WVCO 	8/27/2020	08/01/2021 11/1/2020 PAUSED	Expected 06/31/2022 7/31/2021	Year 1 / 1: \$12,468 Total-to-date: \$12,468 Expected Request: \$0
M-02-PR: IN-DEPTH CHARACTERIZATION OF BOND LINES IN CLT MADE WITH PRESERVATIVE-TREATED LUMBER					
OREGON STATE: G. Presley J. Cappellazzi STUDENT: Cody Wainscott	IAB TC LEAD: Bob Breyer, G-P Chemicals <ul style="list-style-type: none"> Freres Bakelite WVCO 	8/27/20	11/1/20 3/1/2021	Expected 9/30/2022	Year 1 / 1: \$20,000 Total-to-date: \$20,000 Expected Request: \$0

VIRGINIA TECH

N-06-CA: BENCH-SCALE CHARACTERIZATION OF JOINTS AND COATINGS					
VIRGINIA TECH: S. Case B. Lattimer STUDENT: Akhilesh Kulkarni, MS	IAB TC LEAD: Sudip Chowdhury, WVCO <ul style="list-style-type: none"> Arclin Freres LP 	10/14/2021	1/1/2022	Expected 08/30/2022	Year 1 / 1: \$31,342 Total-to-date: \$31,342 Expected Request: \$0
M-04-FR: WAX MIGRATION					
VIRGINIA TECH: C. Frazier STUDENT: JC Stant	IAB TC LEAD: Jesse Paris, WVCO <ul style="list-style-type: none"> Bakelite LP WVCO 	8/27/20	TBD	2 years after start	Year 1 / 2: \$51,372* Year 2 / 2: \$48,372 Total-to-date: \$102,744 Expected Request: \$0

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
I-29-FR: FUNDAMENTALS IN RESOLE FORMULATION					
VIRGINIA TECH: C. Frazier STUDENT: Ryan Gray, PhD	IAB TC LEAD: Todd Miller, Hexion <ul style="list-style-type: none"> Arclin Bakelite Hexion Oxiqum WVCO 	5/17/17	1/5/18	Expected 1/4/22	Year 1: \$45,558 Year 2: \$45,558 Year 3: \$45,558 Year 4: \$52,965 Total-to-date: \$189,639 Expected Request: \$0
I-28-FR: WOOD THERMOCHEMISTRY					
VIRGINIA TECH: C. Frazier STUDENT: Sara Yazdi, PhD	IAB TC LEAD: Darren Riedlinger, Arclin <ul style="list-style-type: none"> Arclin Bakelite WVCO 	10/24/17	1/15/19	Expected 12/2022	Year 1 / 4: \$46,558 Year 2 / 4: \$46,558 Year 3 / 4: \$53,965 Year 4 / 4: \$53,966 Total-to-date: \$201,047 Expected Request: \$0
I-10-FR: CARBON ISOTOPE RATIOS: NOVEL VIEW OF CH2O EMISSIONS					
VIRGINIA TECH: C. Frazier STUDENT: Niloofer Shivyari, MS Mark Cashman, PhD	IAB TC LEAD: Todd Miller, Hexion <ul style="list-style-type: none"> Arclin freres Bakelite Hexion Oxiqum WVCO 	10/13/16	1/10/17	Expected 5/14/22	Part A (Shivyari): Year 1: \$45,180 Year 2: \$45,180 Year 3: \$45,180 Year 4: \$45,180 Part B (Cashman): Year 5: \$0 Year 6: \$33,145 Total-to-date: \$213,865 Expected Request: \$0

COMPLETED RESEARCH

PROJECTS HAVE PRESENTED FINAL REPORT. ORGANIZED PER SITE IN ALPHABETICAL ORDER

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
AUBURN UNIVERSITY					
K-03-PE: EFFECT OF NANOFIBRILLATED CELLULOSE (CNF) AT THE WOOD-BASED MATRIX/RESIN INTERFACE					
Auburn: M. Soledad Peresin Brian Via STUDENT: M. Celeste Iglesias, PhD Philip McMichael, BS	IAB TC LEAD: Bob Breyer, G-P Chemicals <ul style="list-style-type: none"> • Arauco • Arclin • G-P Chemicals • Hexion • LP • Roseburg • WVCO 	9/27/18	2/10/19	Expected 12/31/20	Year 1: \$33,219 Total-to-date: \$33,219 Expected Future Request: \$0
MICHIGAN STATE UNIVERSITY					
SWEETWATER-20: EVALUATING SUITABILITY OF STEAM-EXPLOSION LIGNIN FOR DIFFERENT POLYMERIC RESIN APPLICATIONS					
MICHIGAN STATE: M. Nejad STUDENTS: Saeid Nikafshar, PhD Mohsen Siahkamari, PhD Mona Alinejad, PhD	IAB TC LEAD: Scott Tudman, Sweetwater <ul style="list-style-type: none"> • SWEETWATER • HEXION • WVCO 	11/1/2020	11/1/20	10/31/21	Year 1 / 1: \$35,000 Total-to-date: \$0 Expected Request: \$0
I-19-NE: Suitability of different lignins as polyol replacement in PU adhesive formulation					
Michigan State: M. Nejad (Mona Alinejad, PhD) (IAB TC LEAD: Robert Breyer, G-P Chem)	<ul style="list-style-type: none"> • G-P Chemicals • Hexion • Oxiquim • Roseburg WVCO 	10/24/17	1/1/18	12/31/19	Year 1: \$21,652 Year 2: \$21,848 Total WBC Funding: \$43,500
H-16-NE: Comparative analysis of different lignins as phenol substitutes					
Michigan State: Mojgan Nejad (Isal Kalami, PhD, Christian Henry, PhD)	<ul style="list-style-type: none"> • Arclin • GP Chemicals • Henkel • Hexion • Oxiquim • WVCO 	4/6/16	6/1/16	5/31/17	Year 1 : \$14,00 Total WBC Funding: \$14,000

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
NORTH CAROLINA STATE UNIVERSITY					
I-02-VE: Understanding the machinability of MDF and HDF					
N. Carolina State: G. Velarde D. Saloni OREGON STATE: F. Kamke (Carlos Leca, MS)	(IAB TC LEAD: Darren Riedlinger, Arclin) • Arauco • Arclin • Hexion Roseburg	10/13/16	3/8/18	4/7/19 (Final report delivered Oct 2020)	Year 1: \$46,000 Total WBC Funding: \$46,000
J-05-SA: Investigating the use of biopolymers for additive manufacturing					
NC State: D. Saloni G. Velarde Auburn: M.S. Peresin (Christina Verdi, BS)	(IAB TC LEAD: Bob Breyer, GP Chemicals) • Arauco • G-P Chemicals • Hexion • INVISTA • Oxiquim	10/24/17	1/15/18	5/31/19	Year 1: \$16,000 Total WBC Funding: \$16,000
I-13-SA: Novel adhesives from soybean proteins and biopolymer blends					
N. Carolina State: D. Saloni G. Velarde (no student)	• Arclin • CFP • Evertree • GP Chemicals • Hexion • WVCO	10/13/16	3/1/17	4/30/18	Year 1: \$14,250 Total WBC Funding: \$14,250
H-07-VE: Determination of tool life during CNC machining operations for four panel products					
N. Carolina State: Guillermo Velarde Rick Lemaster (Conrad Michael, BS)	• Arauco • Columbia FP	10/15/15	1/1/16	12/15/16	Year 1 : \$19,136 Total WBC Funding: \$19,136
H-04-LEM: The use of acoustic emission to classify wood chips/particles					
N. Carolina State: Rick Lemaster Guillermo Velarde (Lyndsey Campbell, BS, Kamila Edwards, BS)	• Arauco • LP • Oxiquim	10/15/15	1/1/16	12/15/16	Year 1 : \$14,676 Total WBC Funding: \$14,676

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
OREGON STATE UNIVERSITY					
M-01-KA: REPEATABLE MEASUREMENT METHOD FOR PERCENT WOOD FAILURE					
OREGON STATE: F. Kamke L. Muszynski STUDENT: Talbot Rueppel, MS	IAB TC LEAD: Sarath Vega, LP <ul style="list-style-type: none"> • ARCLIN • FRERES LUMBER • G-P CHEMICALS • LP • OXIQUM • WVCO 	8/27/20	10/1/20	Expected 9/30/22	Year 1 / 2: \$54,053 Year 2 / 2: \$6,709* Total-to-date: \$60,762 Expected Request: \$0 <i>*\$47,862 deducted</i>
K-04-SI: ELUCIDATING THE MECHANISM OF CNF REINFORCEMENT IN WOOD ADHESIVES AND COMPOSITES					
OREGON STATE: J. Simonsen J. Nairn STUDENT: Maria Muñoz, MS	IAB TC LEAD: TBD <ul style="list-style-type: none"> • ARCLIN • HEXION • OXIQUM • WVCO 	9/27/18	9/10/19	Expected 9/30/22	Year 1 / 3: \$45,557 Year 2 / 3: \$57,270 Year 3 / 3: \$15,462 Total-to-date: \$118,289 Expected Request: \$0
J-01-SIN: UNDERSTANDING ELEVATED TEMPERATURE PERFORMANCE OF WOOD COMPOSITES					
OREGON STATE: A. Sinha STUDENT: Byrne Miyamoto, PhD	IAB TC LEAD: Patrick Farrell, Freres Lumber <ul style="list-style-type: none"> • ARCLIN • FRERES LUMBER • HEXION • LP 	10/24/17	4/1/18	Expected 9/30/21	Year 1 / 2: \$54,705 Year 2 / 2: \$53,074 Total-to-date: \$107,779 Expected Request: \$0
K-05-KA: ANALYSIS OF ADHESIVE ATOMIZATION ON COMPOSITE BOND PERFORMANCE					
OREGON STATE: F. Kamke J. Nairn STUDENT: Dylan Willard, MS IAB TC LEAD: Jesse Paris, WVCO	<ul style="list-style-type: none"> • Arauco • Arclin • Boise • G-P Chemicals • Hexion • LP Building Solu • WVCO 	9/27/18	7/1/19	Expected 3/31/21	Year 1: \$39,989 Year 2: \$51,001 Total-to-date: \$90,990 Expected Future Request: \$0

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
FRERES-19: MASS PLYWOOD PANELS: PERFORMANCE, DESIGN AND APPLICATION					
OREGON STATE: F. Kamke – Part I A. Sinha – Part II STUDENT: Matthias Wind, PhD Micah Sutfin, MS	IAB TC LEAD: Patrick Farrell, Freres Lumber <ul style="list-style-type: none"> • Freres Lumber • G-P Chemicals • Hexion • LP Building Solu • WVCO 	8/1/19	10/1/19	Expected 9/30/21	Year 1: \$35,000 Year 2: \$35,000 Total-to-date: \$70,000 Expected Future Request: \$0
J-04-SIN: USING CRACK GROWTH EXPERIMENTS TO UNDERSTAND MOISTURE AND THERMAL DURABILITY OF WBCS					
OREGON STATE: A. Sinha J. Nairn STUDENT: Sweta Mahapatra, MS	IAB TC LEAD: Sudip Chowdhury, WVCO <ul style="list-style-type: none"> • Arclin • G-P Chemicals • LP Building Solu • Oxiquim • WVCO 	10/24/17	4/1/18	9/30/20	Year 1: \$52,205 Year 2: \$52,074 Total-to-date: \$104,279 Expected Future Request: \$0
INVISTA-18: Moisture resistance of wood-based composite materials					
OREGON STATE: F. Kamke S. Leavengood (Luis Molina, MS)	(IAB TC LEAD: Mohan Rao, INVISTA) <ul style="list-style-type: none"> • Arclin • Boise • G-P Chemicals • Hexion • INVISTA • LP Building Solu • Oxiquim • Roseburg 	9/27/18	10/1/18	6/30/20	Year 1: \$54,302 Year 2: \$42,569 Total WBC Funding: \$96,871
I-26-KA: Characterizing accelerated weathering conditions (continuation of H-13-KA)					
OREGON STATE: F. Kamke (Micah Sutfin, MS)	(IAB TC LEAD: Curtis Burton, WVCO) <ul style="list-style-type: none"> • Arclin • Boise • WVCO 	5/17/17	1/1/18	9/29/19	Year 1: \$46,038 Year 2: \$1951 Total WBC Funding: \$47,989
I-06-SIN: Understanding moisture gradients during accelerated weathering through numerical modeling					
OREGON STATE: A. Sinha F. Kamke (Danny Way, PhD)	<ul style="list-style-type: none"> • Ashland • Boise • Fraunhofer • LP • Weyerhaeuser 	10/13/16	4/1/17	8/15/18	Year 1: \$56,000 Total WBC Funding: \$56,000

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
A-11-SM: Improving blending efficiency and resin distribution of the rotary drum blending process using discrete element modeling					
UBC: G. Smith (Ying-Li Tsai, PhD)	<ul style="list-style-type: none"> Arclin GP Chemicals 	9/15/10	4/1/11	Expected Spring 2017 (3/10/17 defense) 10/17: Delayed indefinitely.	Year 1: \$44,000 Year 2: \$25,206 Year 3: \$36,634 Year 4: \$20,817 Total WBC Funding: \$126,657
F-02-LE: Checking in maple plywood					
OREGON STATE: S. Leavengood L. Muszynski (Elijah Wilson, MS)	<ul style="list-style-type: none"> Columbia FP Henkel Weyerhaeuser 	10/16/14	1/1/16	3/31/18	Year 1: \$15,529 Year 2: \$31,515 Year 3: \$24,236 Total WBC Funding: \$70,280
I-20-KA: Comparison of accelerated weathering test protocols – Part B (continuation of H-13-KA)					
OREGON STATE: F. Kamke (Luis Molina, BS)	<ul style="list-style-type: none"> Arclin Ashland Boise WVCO 	5/17/17	8/1/17	1/23/18	Year 1: \$6625 Total WBC Funding: \$6625
Fraunhofer-16: Wood composite performance assessment and certification needs for Western U.S.					
OREGON STATE: F. Kamke P.F. Laleicke	<ul style="list-style-type: none"> Arclin Fraunhofer WVCO 	4/6/16	6/1/16	12/31/17	Year 1: \$105,736 Year 2: \$68,527 Year 3: \$59,422 Total WBC Funding: \$233,685
I-08-LI: Lignin-based polymers with enhanced adhesive and elastomeric properties					
OREGON STATE: Z. Glen Li (Dylan Packard, BS)	<ul style="list-style-type: none"> Arclin GP Chemicals Hexion Oxiquim WVCO 	10/13/16	11/1/16	10/31/17	Year 1: \$16,650 Total WBC Funding: \$16,650
I-15-NA: Numerical simulations of adhesive penetration in various wood species					
OREGON STATE: J. Nairn (Chad Hammerquist, PhD)	<ul style="list-style-type: none"> Arclin GP Chemicals Hexion WVCO 	10/13/16	10/1/16	10/1/17	Year 1: \$28,166 Total WBC Funding: \$28,166

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
F-08-KA (OSU only): Wetting and diffusion associated with selected liquid/wood interfaces					
OREGON STATE: F. Kamke (Balkis Bakar, Elizabeth Mills)	<ul style="list-style-type: none"> • Arclin • Hexion • WVCO 	10/16/14	4/1/15 (OSU)	1/1/17	Year 1: \$21,670 Year 2: \$45,694 Year 3: \$11,227 Total WBC Funding: \$78,591
VIRGINIA TECH: C. Frazier (Christa Stables, MS)			6/15/15 (VT)	9/6/17	
F-01-KA: Multi-scale accelerated weathering of wood composite materials					
OREGON STATE: F. Kamke A. Sinha (Danny Way, MS)	<ul style="list-style-type: none"> • Arclin • Ashland • Boise • Fraunhofer • LP 	10/16/14	4/1/15	3/31/17	Year 1: \$55,857 Year 2: \$44,904 Total WBC Funding: \$100,761
H-13-KA: Comparison of accelerated weathering test protocols					
OREGON STATE: F. Kamke (Valeria Luna, BS, Tomas Lasserre, BS)	<ul style="list-style-type: none"> • Arclin • Ashland • Hexion 	4/6/16	7/1/16	12/31/16	Year 1 : \$8500 Total WBC Funding: \$8500
FUND-13: Multi-scale investigation of adhesive bond durability					
OREGON STATE: F. Kamke A. Sinha (Paige McKinley, MS w/D. Ching, PhD, D.Way, PhD)	<ul style="list-style-type: none"> • Arclin • APS • USDA FPL 	8/1/13 (2-year award)	7/1/14	12/31/16 (NCE)	Year 1: \$98,096 Year 2: \$98,095 Total NSF Funding: \$196,191 Total WBC Funding: \$0
H-15-KA: Analysis of vertical density profile during hot pressing					
OREGON STATE: F. Kamke (Kenya Hazell, PhD, Günther Schagerl, BS)	<ul style="list-style-type: none"> • Arauco • Arclin • Hexion • LP • Oxiquim 	4/6/16	7/1/16	10/31/16	Year 1 : \$8845 Total WBC Funding: \$8845
H-03-LI: Bio-based polyamide with oligomeric lignin backbone					
OREGON STATE: Z. (Glen) Li (Jacob Staudhammer, BS)	<ul style="list-style-type: none"> • Arclin • Henkel • Oxiquim 	10/15/15	1/4/16	10/1/16	Year 1 : \$2500 Total WBC Funding: \$2500
H-01-NA: Numerical simulation of adhesive penetration into realistic wood structures					

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
OREGON STATE: John Nairn (Chad Hammerquist, PhD)	<ul style="list-style-type: none"> States Industries WVCO 	10/15/15	1/1/16	5/1/16	Year 1 : \$8750 Total WBC Funding: \$8750
B-02-NA: Methodologies for ranking resins by their effects on durability of wood composites					
OREGON STATE: J. Nairn A. Sinha (B. Mirzaei, PhD, w/J. Adam, BS, D. Terry, BS)	<ul style="list-style-type: none"> Arclin Fraunhofer-WKI GP Chemicals 	10/18/12	1/1/13	3/31/16	Year 1: \$43,498 Year 2: \$43,373 Year 3: \$49,682 Total WBC Funding: \$136,553
D-02-KA: Application of accelerated weathering for the development of an NDT product durability assessment toolkit					
OREGON STATE: F. Kamke (P.F. Laleicke, PhD)	<ul style="list-style-type: none"> GP Chemicals WVCO 	10/8/13	1/1/14	12/31/15	Year 1: \$25,670 Year 2: \$54,325 Total WBC Funding: \$79,995
SUPP-OSU-13: I/UCRC Innovations Fellows Supplement (NSF-funded)					
OREGON STATE: F. Kamke (M. Schwarzkopf, PhD)	<ul style="list-style-type: none"> Fraunhofer-WKI 	9/25/13 (1-yr award)	9/25/13	7/30/14	Year 1: \$16,633 Total WBC Funding: \$0 Total NSF Funding: \$16,633
A-22-SM: Resin efficiency for non-structural panels					
UBC: G. Smith (J. Dettmer, MS) OREGON STATE: L. Muszynski J. Simonsen (N. Lampert, MS)	<ul style="list-style-type: none"> Ashland GP Chemicals Momentive 	9/15/10	4/1/11	4/16/14	Year 1: \$59,500 Year 2: \$53,811 Total WBC Funding: \$113,311
A-04-KA: Microscale wood adhesive interaction					
OREGON STATE: F. Kamke L. Muszynski J. Nairn (J. Paris, PhD, M. Schwarzkopf, PhD)	<ul style="list-style-type: none"> Arclin Ashland Henkel Weyerhaeuser 	9/15/10	10/1/10	10/1/13	Year 1: \$35,600 (total: \$85,600) Year 2: \$62,230 Year 3: \$48,577 Total WBC Funding: \$146,407
C-01-KA: Preliminary investigation of adhesive bonds using IR microscopy					
OREGON STATE: F. Kamke (P. Boehm, MS, S. Freitas, PhD)	<ul style="list-style-type: none"> GP Chemicals WVCO 	10/18/12	2/1/13	7/31/13	Year 1: \$10,937 Total WBC Funding: \$10,937

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
A-19-GU: Impact of short veneer on bending properties of LVL					
OREGON STATE: R. Gupta F. Kamke (S. Mlasko, BS, M. Belda, BS)	<ul style="list-style-type: none"> GP Chemicals Momentive Weyerhaeuser 	9/15/10	1/1/11	7/30/11	Year 1: \$9000 Total WBC Funding: \$9,000

VIRGINIA TECH

K-02-CA: BENCH-SCALE SCREENING TEST FOR ASTM E119

VIRGINIA TECH: S. Case B. Lattimer STUDENT: Michael Gangi, PhD	IAB TC LEAD: Jim Ni, LP <ul style="list-style-type: none"> ARCLIN FRERES LUMBER G-P CHEMICALS LP OXIQUIM 	10/10/19	1/1/20	Expected 12/2021	Year 1: \$55,399 Year 2: \$55,000 Total-to-date: \$110,399 Expected Request: \$0
--	--	----------	--------	---------------------	---

J-02-HA: GEOMETRY AND MECHANICS OF PANEL WARPAGE

VIRGINIA TECH: J. Loferski Univ of Nevada/Reno: J. Hanna STUDENT: Harrison Wood, MS; Kerrigan Strong, MS	IAB TC LEAD: Dave Ruth, Boise <ul style="list-style-type: none"> Boise CFP Oxiqum Roseburg 	10/24/17	12/26/17	Expected 7/13/21	Year 1: \$47,810 Year 2: \$50,000 Year 3: \$42,079 Total-to-date: \$139,889 Expected Future Request: \$0
--	---	----------	----------	---------------------	--

I-01-DI: DEVELOPING METHODOLOGY TO INTERROGATE HIGH/LOW DENSITY WOOD BONDS (FORMERLY: CHARACTERIZING ADHESION BETWEEN HIGH AND LOW DENSITY WOODS)

VIRGINIA TECH: S. Case D. Dillard C. Frazier STUDENT: Kayla Howes, MS Yuqin Li, PhD Angelo Said, BS Jessie Johnson, BS	IAB TC LEAD: Sudip Chowdhury <ul style="list-style-type: none"> CFP G-P Chemicals Queensland WVCO 	10/13/16	5/1/17	Expected 12/30/20	Year 1: \$42,153 Year 2: \$43,766 Year 3: \$43,773 Total-to-date: \$129,692 Expected Future Request: \$0
--	--	----------	--------	----------------------	--

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
H-17-ZS: Adhesive challenges with maple & hickory veneer at low moisture levels					
VIRGINIA TECH: Zink-Sharp (Cody Wykle, MS; Alexandra Flevarakis, BS; Dylan Harris, BS)	(IAB TC LEAD: Fred Carter, CFP) • CFP • Henkel	4/6/16	9/1/16	4/15/19	Year 1 : \$38,784 Year 1.5: \$20,446 Total WBC Funding: \$59,230
I-31-RO: Dispersion force-based new adhesive concept					
VIRGINIA TECH: M. Roman (Apratim Jash, PhD)	(IAB TC LEAD: TBD) • Arclin • Fraunhofer • GP Chemicals • Hexion • Oxiquim • WVCO	5/17/17	1/1/18	Expected 12/31/21 (Project cancelled by IAB TC, 10/18)	Year 1: \$48,582 Total-to-date: \$48,582 Expected Year 2 Request: \$50,338 (Fall 2018) (9/27/18: cancelled; returned \$34,431)
F-07-FR: MDF fiber quality					
VIRGINIA TECH: C. Frazier (Mohammad Tasooji, PhD)	• Arauco NA • Arclin • Columbia FP • GP Chemicals • WVCO	10/16/14	10/20/14	5/9/18	Year 1 : \$48,890 Year 2: \$48,890 Year 3: \$27,310 Total WBC Funding: \$125,090
F-08-KA (VT only): Wetting and diffusion associated with selected liquid/wood interfaces					
OREGON STATE: F. Kamke (Balkis Bakar, Elizabeth Mills) VIRGINIA TECH: C. Frazier (Christa Stables, MS)	• Arclin • Hexion • WVCO	10/16/14	4/1/15 (OSU) 6/15/15 (VT)	1/1/17 9/6/17	Year 1: \$42,559 Year 2: \$39,255 Total WBC Funding: \$81,814
F-05-FR: Biogenic formaldehyde emission					
VIRGINIA TECH: C. Frazier (Guigui Wan, PhD)	• Arauco NA • Arclin • Hexion • Oxiquim	10/16/14	10/1/14	12/20/16	Year 1: \$48,890 Year 2: \$41,890 Total WBC Funding: \$90,780
F-04-FR: Organic fillers used in PF resoles					
VIRGINIA TECH: C. Frazier (X. (Chuck) Wang, MS)	• Arclin • GP Chemicals • Hexion • WVCO	10/16/14	10/30/14	8/31/16	Year 1 : \$16,000 Year 2: \$47,446 Total WBC Funding: \$63,446

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
SUPP-IMD-13: Innovative Managing Director Model I/UCRC Supplement					
VIRGINIA TECH: C. Frazier (L. Caudill)	<ul style="list-style-type: none"> • NA 	9/18/13 (up to 3 yr. award)	9/18/13	7/31/16	Year 1: \$200,000 Year 2: \$200,000 Total NSF Funding: \$400,000 Total WBC Funding: \$0
G-05-FR: Surfactants: Fundamental impacts in veneer bonding					
VIRGINIA TECH: C. Frazier (TBD)	<ul style="list-style-type: none"> • Arclin • GP Chemicals • Hexion 	5/7/15	TBD	(Postponed indefinitely due to Phase II delay)	Year 1: \$49,636 Total-to-date: \$0 Expected Year 2 funding request: \$49,636
Queensland-13: Adhesion fundamentals in spotted gum (Corymbia sp.)					
VIRGINIA TECH: C. Frazier (C. Burch, MS)	<ul style="list-style-type: none"> • Hexion • Queensland Govt. 	7/1/12	1/22/13	11/6/15	Year 1: \$40,000 Year 2: \$40,000 Total WBC Funding: \$80,000
B-18-ZS: Understanding the differences in bonding characteristics of Douglas-fir and SYP wood					
VIRGINIA TECH: Zink-Sharp S. Rennecker (K. Mirabile, MS)	<ul style="list-style-type: none"> • GP Chemicals • Henkel • Hexion 	9/21/11	1/8/13	11/9/15	Year 1: \$29,550 Year 2: \$29,750 Year 3: \$3006 Total WBC Funding: \$62,306
F-06-FR: Formaldehyde in tree increment cores					
VIRGINIA TECH: C. Frazier (H.Wise, BS, G.Lewis, BS)	<ul style="list-style-type: none"> • Arauco NA • GP Chemicals 	10/16/14	10/20/14	7/15/15	Year 1 : \$7300 Total WBC Funding: \$7300
A-12-CO: Fundamentals of formaldehyde detection and emission determination					
Maine: B. Cole D. Gardner R. Fort VIRGINIA TECH: C. Frazier (S. Blosch, A. Hellenbrand, MS)	<ul style="list-style-type: none"> • Arclin • GP Chemicals • Momentive • Solenis 	9/15/10	1/10/11	12/31/14	Year 1: \$19,500 (Total: \$44,500) Year 2: \$45,964 Year 3: \$47,340 Year 4: \$48,950 Total WBC Funding: \$186,754

FACULTY	TECHNICAL ADVISORS	AWARD DATE	START DATE	END DATE	FUNDING
FUND-12: Mechanisms of wood-generated formaldehyde emission (Continued as F-05-FR: Biogenic formaldehyde emission, Fall 2014)					
VIRGINIA TECH: C. Frazier (G. Wan, PhD)	<ul style="list-style-type: none"> • NA/pending 	8/15/11 (2-yr. award)	5/21/12	9/30/14	Year 1: \$99,725 Year 2: \$99,725 Total NSF Funding: \$199,450 Total WBC Funding: \$0
A-24-FR: Influence of filler particle size on adhesive penetration and performance					
VIRGINIA TECH: C. Frazier (X. Yang, PhD)	<ul style="list-style-type: none"> • GP Chemicals • Momentive • WVCO 	9/15/10	1/18/11	9/22/14	Year 1: \$11,612 Year 2: \$7836 Year 3: \$38,760 Year 4: \$38,687 Total WBC Funding: \$96,895
A-14-FR: Formaldehyde determination through liquid extraction (formerly, Wood modifications promoting durable adhesion)					
VIRGINIA TECH: C. Frazier Zink-Sharp (M. Tasooji, MS)	<ul style="list-style-type: none"> • Henkel • Weyerhaeuser • WVCO 	9/15/10	8/10/11	5/29/14	Year 1: \$48,000 Year 2: \$38,000 Year 3: \$18,600 Total WBC Funding: \$104,600
D-01-FR: Formaldehyde/wood mass transfer					
VIRGINIA TECH: C. Frazier (C. Burch – reassigned to Queensland-13)	<ul style="list-style-type: none"> • Arclin 	10/8/13	8/26/13	Project terminated 4/17/14	Year 1 : \$38,795 Total WBC Funding: \$0 (LCC: funds returned)
B-01-LI: Developing a reference material for formaldehyde emissions testing					
VIRGINIA TECH: J. Little S. Cox C. Frazier (X. Zhao, MS)	<ul style="list-style-type: none"> • Arclin • Weyerhaeuser 	6/20/12	8/27/12	8/26/13	Year 1: \$44,500 Total WBC Funding: \$44,500