January 2017 News from the International Biochar Initiative for Members and Supporters

IBI Signs New Agreement for Association Services with TTC

IBI signed an agreement with Technology Transition Corp, a D.C. based company that has been helping clean energy companies and associations to enlarge their markets and memberships and network with other players in the field. The IBI Board has been looking for a collaborative partner to help us grow the organizations membership and to provide more value added services to our members. Moving forward TTC will provide membership administration, bookkeeping and webinar support amongst other critical services.

IBI Announces Webinar Series for 2017

Due to our new relationship with TTC, the IBI is very pleased to announce a relaunch of our biochar educational webinar series. Our plan is to host monthly 60 minute webinars that are free to IBI members or can be attended by non-members for a fee of $40 per webinar. All webinars will be recorded and made available to IBI members or those that have paid to attend. Members with suggestions for subjects or potential speakers, please send an email to: webinars@biochar-international.org.

Dr. Marta Camps presented the first webinar on January 30th on the topic of 'A biochar classification system for use in soils'. Future webinars currently being planned are listed below. Further details on dates and speakers will be publicized in the near future.

February	Composting & Biochar
March:	Sewage Sludge & Biochar
April:	Carbonizing Urban Green Waste
May:	Biochar building materials & Composites

New and renewing organizational & business member spotlight

Note: corporate bios below were provided by members and not written by IBI

Renewing business member: T. R. Miles

T.R. MILES, TECHNICAL CONSULTANTS, INC. provides technical assistance primarily to industry for complete system design, product, and process development for the wood, food, agricultural, waste, and energy industries. The firm has special expertise in pyrolysis, combustion and gasification of biomass fuels such as wood, straws, stalks, and manures. It has designed, developed, installed, and tested systems for harvesting and processing of field crops and residues; harvesting and processing of forest residues and urban wood; waste handling and processing; boilers, combustion, carbonization and gasification; organic recycling; composting; and, manure management. TRM TCI has sponsored and hosted internet discussions of biomass energy including gasification and anaerobic digestion since 1994 and biochar since 2006. The firm is active in both the International Biochar Initiative and the US Biochar

Initiative to promote the use of biochar for soil health, organic recycling and nutrient management worldwide. www.trmiles.com www.bioenergylists.org

New business member: America Sequesters, United States

America Sequesters CO2 was founded with the belief that a little biochar made by a lot of people can make a difference in the fight against climate change. Our patent pending product, the BioCharlie, enables people to easily make biochar while enjoying a fire in their fireplace at home. The retort is designed in the shape and size of a log and is placed in the fire with other logs while they burn. Flames can be seen coming out of the vent holes as off gasses are released, giving the illusion that the metal log is burning. The BioCharlie is removed the next day after it cools and the biochar is emptied. Batches of biochar can be used to improve the soil in the garden or with potted plantings. The BioCharlie is built to hold up in fire and can be used over and over whenever you want to relax by your fireplace. We make the process simple and fun, kind of like baking an environmental cake with this new accessory for your fireplace.

Our goal at America Sequesters CO2 is to make biochar a commonly known word among non-technical people and to raise awareness of its benefits. Our customers are gardeners, the environmentally conscious, and anybody with a fireplace, wood stove or fire pit who wants to take carbon out of the air and put it back into the soil. "Let Your Fireplace Go Green Tonight" is the tag line for the BioCharlie and many have been sold all over the US and Canada through Amazon and on our own website biocharlie.com.
For more information please contact jim@americasequestersco2.com

New business member: Anaerobe Systems, United States

Through innovation and research, Anaerobe Systems is developing technology to reliably and rapidly produce hydrogen for biogas applications and organic fertilizers. We are committed to creating a process that can be built at a local level to promote sustainable farming, to reduce transportation costs in waste disposal and energy generation, and to provide economic stimulation for California farmers. With over 40 years of expertise in anaerobic microbiology and engineering, we have the capability to craft a highly efficient fermentation process that can breakdown agricultural waste, produce hydrogen, and return the essential vitamins and nutrients for crop growth back to the farm.

Our solid soil amendment is combined with BioChar to create FermeChar, a loaded BioChar. More details here: www.fermegrow.com

Conference & Event Updates

Compost 2017. Biochar was well represented at the annual meeting of the US Composting Council (compostingcouncil.org) in Los Angeles, California, January 23-27, 2017. There was considerable interest in how biochar could be used with compost for growing media, landscaping, stormwater filtration, and erosion control. Organic recycling managers were interested to know how biochar could help recycle or reuse woody waste and biosolids. Biochar producers, Phil Blom (Terra Char), Josiah Hunt (Pacific Biochar) and Michael Whitman (Blue Sky Biochar) spread the biochar message among the more than 90 exhibitors and 1080 visitors attending the conference. IBI Chairman, Tom Miles, provided an overview of biochar production and use. Jack Hoeck, Rexius Products, described how his company uses biochar to produce commercial potting soil and growing media (Opus Grows). Dave Crohn, University of California, Riverside, described results from multi-year trials using compost, biochar and biosolids for managing water in turf. Greg Stangl, Phoenix Energy, described their production of biochar and power as a solution to the excess wood in California.

Opus Grows Biotope, biochar based retail growing media. www.opusgrows.com

Phoenix Energy power plant produces 500 kWe and biochar from residues in Merced, California. www.phoenixenergy.net

ETHOS 2017 Small scale biochar production and use was discussed at the annual conference of the Engineers in Technical and Humanitarian Opportunities of Service (www.ethoscon.com) An estimate 2.5 billion people worldwide cook their meals with biomass. ETHOS is an international group of individuals and organizations that promote improved cooking stoves for health, safety, and household energy. The Toplit Updraft or TLUD stoves are efficient and can produce biochar as a co-product of household energy. Participants were interested in how biochars can be used to remediate soils and improve agriculture. Norman Baker, Sequim, showed how a 55 gallon TLUD can be used to make biochar for growing vegetables and improving nutrition. Paul Anderson described 12,000 TLUD stoves in India that product 10 tons of biochar each day. Users receive cash from selling the biochar to a German company, atmosfair gGmbH, which recovers carbon offsets for the energy savings and char to help fund the energy efficient cooking stoves. Art Donnelly, Seachar (seachar.org) demonstrated a new biochar making stove and described how biochar from cooking stoves has been used by coffee workers in Costa Rica. ETHOS participants are among the 1600 partners of the Global Alliance for Clean Cookstoves (cleancookstoves.org)

	
Champion model TLUD used to cook food and make biochar in Deganga, India. Paul Anderson (drtlud.com/deganga-tlud-project-2016)	Making biochar in an engineered 55 gallon TLUD. Norman Baker and Paul Taylor. biochar-us.org/presentation/55gallon-tlud-progress-and-developments

5kW TLUD Seachar stove at low power. Seachar.org

Support IBI – Join or volunteer today!

Join, renew or donate to support IBI. We encourage all those that have yet to renew their membership, to do so now via the IBI website.

IBI is looking for volunteers to help us grow our organization. We are looking for assistance with membership management and growth, fundraising, updating our website and more. If you have an interest in helping, please send an email to info@biochar-international.org.

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The IBI Online Biochar Training Course is Ongoing

Gain in-depth knowledge on biochar and biochar systems. Register for IBI's online course, Biochar Training for Environmental Sustainability and Economic Development. This ten week, ongoing course provides participants an intensive training series on all aspects of biochar, presented by leading biochar

experts. Learn about best-science updates on biochar, biochar production and use, how to overcome the barriers to commercialization. 19 separate lessons-each with a subject overview, a recorded audio/video presentation lasting 30 - 45 minutes and quizzes to test comprehension and retention. An optional introductory presentation on the basics of biochar allows participants to start the course with a common understanding. Course materials are presented in a user-friendly online format. Participants can access the course at their convenience over ten weeks and will receive a certificate of completion at the conclusion of the course.

Course materials are based on presentations from the June 2014 in-person biochar training course titled, "Biochar for Environmental Sustainability and Economic Development," hosted by the University of Santiago de Compostela, Spain, and developed and presented by IBI and collaborators. For more information on member and non-member pricing and registration, please see: www.biochar-international.org/online_course

Upcoming Calendar Events

- The Forum for Climate Engineering Assessment is holding a workshop for non-governmental organizations on carbon dioxide removal/negative emissions technologies options, on **February 8**, 2017 at UC-Berkeley, California. Brian von Herzen of the Climate Foundation will be speaking about biochar, but other biochar researchers and practitioners are warmly invited to attend. Registration information will be posted soon on their website: http://ceassessment.org/ Please contact Dr. Wil Burns for further information: wil@feronia.org
- Water & Wastewater Equipment, Treatment & Transport Show, **February 22 – 25**, 2017, Indiana Convention Center,
- BIOCYCLE EAST COAST17 Baltimore, Maryland Turf Valley Hotel, **April 4 - 7**, 2017, Call For Papers Open Now
- Biochar: Production, Characterization & Applications, Alba, Italy, Hotel Calissano, **August 20-25,** 2017; Call for Abstracts Deadline: Feb. 28, 2017
- International Symposium on Growing Media, Soilless Cultivation, and Compost Utilization in Horticulture, **August 20-25**, in Portland OR. Attendees are welcome to submit abstracts and requests to give talks/presentations (or posters) during the meeting as well if desired.

See the IBI Calendar page for more events. To add an event to the calendar, send the information to info@biochar-international.org .

Recently Published Biochar Research and Resources

Mandal, S; Sarkar, B; Bolan, N; Ok, YS; Naidu, R *Enhancement of chromate reduction in soils by surface modified biochar*. JOURNAL OF ENVIRONMENTAL MANAGEMENT 186, 277-284

Seneviratne, M; Weerasundara, L; Ok, YS; Rinklebe, J; Vithanage, M Phytotoxicity attenuation in Vigna radiata under heavy metal stress at the presence of biochar and N fixing bacteria. JOURNAL OF ENVIRONMENTAL MANAGEMENT 186, 293-300

Lan, ZM; Chen, CR; Rashti, MR; Yang, H; Zhang, DK *Stoichiometric ratio of dissolved organic carbon to nitrate regulates nitrous oxide emission from the biochar-amended soils*. SCIENCE OF THE TOTAL ENVIRONMENT 576, 559-571

Wu, WD; Li, JH; Lan, T; Muller, K; Niazi, NK; Chen, X; Xu, S; Zheng, LR; Chu, YC; Li, JW; Yuan, GD; Wang, HL *Unraveling sorption of lead in aqueous solutions by chemically modified biochar derived from coconut fiber: A microscopic and spectroscopic investigation*. SCIENCE OF THE TOTAL ENVIRONMENT 576, 766-774

Sun, JL; Drosos, M; Mazzei, P; Savy, D; Todisco, D; Vinci, G; Pan, GX; Piccolo, A *The molecular properties of biochar carbon released in dilute acidic solution and its effects on maize seed germination*. SCIENCE OF THE TOTAL ENVIRONMENT 576,858-867

Hansen, V; Muller-Stover, D; Imparato, V; Krogh, PH; Jensen, LS; Dolmer, A; Hauggaard-Nielsen, H *The effects of straw or straw-derived gasification biochar applications on soil quality and crop productivity: A farm case study*. JOURNAL OF ENVIRONMENTAL MANAGEMENT 186,88-95

Wang, P; Tang, L; Wei, X; Zeng, GM; Zhou, YY; Deng, YC; Wang, JJ; Xie, ZH; Fang, W *Synthesis and application of iron and zinc doped biochar for removal of p-nitrophenol in wastewater and assessment of the influence of co-existed Pb(II).* APPLIED SURFACE SCIENCE 392,391-401

Xu, XB; Hu, X; Ding, ZH; Chen, YJ; Gao, B *Waste-art-paper biochar as an effective sorbent for recovery of aqueous Pb(II) into value-added PbO nanoparticles*. CHEMICAL ENGINEERING JOURNAL 308,863-871

Wang, S; Gao, B; Li, Y; Creamer, AE; He, F *Adsorptive removal of arsenate from aqueous solutions by biochar supported zero-valent iron nanocomposite: Batch and continuous flow tests.* JOURNAL OF HAZARDOUS MATERIALS 322,172-181

Reguyal, F; Sarmah, AK; Gao, W *Synthesis of magnetic biochar from pine sawdust via oxidative hydrolysis of FeCl2 for the removal sulfamethoxazole from aqueous solution*, JOURNAL OF HAZARDOUS MATERIALS 321,868-878

Zhu, MM; Zhang, ZZ; Zhang, Y; Liu, PF; Zhang, DK *An experimental investigation into the ignition and combustion characteristics of single droplets of biochar water slurry fuels in air*, APPLIED ENERGY 185,2160-2167

Beckingham, B; Ghosh, U *Differential bioavailability of polychlorinated biphenyls associated with environmental particles: Microplastic in comparison to wood, coal and biochar*, ENVIRONMENTAL POLLUTION 220,150-158

Wang, N; Xue, XM; Juhasz, AL; Chang, ZZ; Li, HB. *Biochar increases arsenic release from an anaerobic paddy soil due to enhanced microbial reduction of iron and arsenic*. ENVIRONMENTAL POLLUTION 220, 514-522

Kahraman, HT; Pehlivan, E *Cr6+ removal using oleaster (Elaeagnus) seed and cherry (Prunus avium) stone biochar* POWDER TECHNOLOGY 306,61-67

Lee, J; Yang, X; Cho, SH; Kim, JK; Lee, SS; Tsang, DCW; Ok, YS; Kwon, EE *Pyrolysis process of agricultural waste using CO2 for waste management, energy recovery, and biochar fabrication*. APPLIED ENERGY 185,214-222

Esfandbod, M; Phillips, IR; Miller, B; Rashti, MR; Lan, ZM; Srivastava, P; Singh, B; Chen, CR *Aged acidic biochar increases nitrogen retention and decreases ammonia volatilization in alkaline bauxite residue sand* ECOLOGICAL ENGINEERING 98,157-165

Zhang, RH; Li, ZG; Liu, XD; Wang, BC; Zhou, GL; Huang, XX; Lin, CF; Wang, AH; Brooks, M *Immobilization and bioavailability of heavy metals in greenhouse soils amended with rice straw-derived biochar* ECOLOGICAL ENGINEERING 98,183-188

Sun, HJ; Lu, HY; Chu, L; Shao, HB; Shi, WM. *Biochar applied with appropriate rates can reduce N leaching, keep N retention and not increase NH3 volatilization in a coastal saline soil* SCIENCE OF THE TOTAL ENVIRONMENT 575 820-825

Liu, Q; Liu, BJ; Zhang, YH; Lin, ZB; Zhu, TB; Sun, RB; Wang, XJ; Ma, J; Bei, QC; Liu, G; Lin, XW; Xie, ZB *Can biochar alleviate soil compaction stress on wheat growth and mitigate soil N2O emissions?* SOIL BIOLOGY & BIOCHEMISTRY 104 8-17

Cui, J; Ge, TD; Kuzyakov, Y; Nie, M; Fang, CM; Tang, BP; Zhou, *CL Interactions between biochar and litter priming: A three-source C-14 and delta C-13 partitioning study* SOIL BIOLOGY & BIOCHEMISTRY 104 49-58

Thines, KR; Abdullah, EC; Mubarak, NM; Ruthiraan, M *Synthesis of magnetic biochar from agricultural waste biomass to enhancing route for waste water and polymer application: A review* RENEWABLE & SUSTAINABLE ENERGY REVIEWS 67 257-276

Chen, JH; Li, SH; Liang, CF; Xu, QF; Li, YC; Qin, H; Fuhrmann, JJ *Response of microbial community structure and function to short-term biochar amendment in an intensively managed bamboo (Phyllostachys praecox) plantation soil: Effect of particle size and addition rate* SCIENCE OF THE TOTAL ENVIRONMENT 574 24-33

Macreadie, PI; Trevathan-Tackett, SM; Baldock, JA; Kelleway, JJ. *Converting beach-cast seagrass wrack into biochar: A climate-friendly solution to a coastal problem* SCIENCE OF THE TOTAL ENVIRONMENT 574 90-94

Suliman, W; Harsh, JB; Abu-Lail, NI; Fortuna, AM; Dallmeyer, I; Garcia-Perez, M *The role of biochar porosity and surface functionality in augmenting hydrologic properties of a sandy soil* SCIENCE OF THE TOTAL ENVIRONMENT 574 139-147

Sun, JN; He, FH; Pan, YH; Zhang, ZH *Effects of pyrolysis temperature and residence time on physicochemical properties of different biochar types* ACTA AGRICULTURAE SCANDINAVICA SECTION B-SOIL AND PLANT SCIENCE 67 12-22

Fidel, RB; Laird, DA; Thompson, ML; Lawrinenko, M., *Characterization and quantification of biochar alkalinity* CHEMOSPHERE 167 367-373

Hallin, IL; Douglas, P; Doerr, SH; Matthews, I; Bryant, R; Charbonneau, C. *The potential of biochar to remove hydrophobic compounds from model sandy soils* GEODERMA 285 132-140

Kolodynska, D; Krukowska, J; Thomas, *P. Comparison of sorption and desorption studies of heavy metal ions from biochar and commercial active carbon* CHEMICAL ENGINEERING JOURNAL 307 353-363

Obia, A; Borresen, T; Martinsen, V; Cornelissen, G; Mulder, J. *Vertical and lateral transport of biochar in light-textured tropical soils* SOIL & TILLAGE RESEARCH 165 34-40

Gonzaga, MIS; Mackowiak, CL; Comerford, NB; Moline, EFD; Shirley, JP; Guimaraes, DV *Pyrolysis methods impact biosolids-derived biochar composition, maize growth and nutrition* SOIL & TILLAGE RESEARCH 165 56-65

Fungo, B; Lehmann, J; Kalbitz, K; Thiongo, M; Okeyo, I; Tenywa, M; Neufeldt, H *Aggregate size distribution in a biochar-amended tropical Ultisol under conventional hand-hoe tillage* SOIL & TILLAGE RESEARCH 165 190-197