

TTÜ Tartu Kolledž
2020 .a. teadus- ja arendustegevuse aruanne

Struktuuriüksuse struktuur 2020. a

Tartu kolledž
Lembit.Nei, direktor
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Tartu kolledž, Puiestee 78, Tartu 51008

Kolledžis tegutsevad uurimisrühmad:

- Ehitatud keskkonna uurimisrühm / Built Environment Research group
- Keskkonnatehnoloogia uurimisrühm / Research group of Environmental Technologies

1 Ehitatud keskkonna uurimisrühm

1.1 Uurimisrühma juht: Aime Ruus, dotsent, aime.ruus@taltech.ee

1.2 Uurimisrühma liikmed

Zenia Kotval, PhD, kaasatud professor
Mihkel Kiviste, al. 01.09.20 vanemteadur (alates 01.01.21 professor)
Merik Meriste, PhD, dotsent,
Ernst Tungel, PhD, dotsent,
Nele Nutt, PhD, vanemlektor,
Helle Hallik, PhD, vanemlektor
Ago Rootsi, MSc, lektor,
Jiri Tintera, MSc, vanemlektor, PhD
Sven Oras, PhD, vanemlektor
Jane Raamets MSc, lektor, PhD (al.17.12.20)
Lehar Leetsaar, MSc, lektor, doktorant,
Taisi Kadarik, MSc, lektor
Karin Muoni, MSc, lektor

Minea Kaplinski-Sauk, MSc, doktorant,
Ardo Kubjas, MSc, doktorant

Sirle Salmistu, PhD, külalisõppejõud, alates 01.01.2021 Mobilitas Pluss järeldoktor

Rinaldo Rütli, MSc, insener

1.3 Võtmesõnad

Mahajäetud ja alakasutatud alad (*brownfields*), linnaplaneerimine, puitarhitektuuri ajalugu, ehitusmaterjalid, ümbertöödeldud täitematerjalist betoon, sisekliima, looduslikud ehitusmaterjalid

1.4 Uurimisalused teemad ja uurimisrühma kompetentsid

(1) ehitatud keskkond, linna- ja regionaalplaneering; (2) kogukondlik areng, linna- ja maa-asustuse majanduslikult ökonoomne taaskasutamine ja ümberkujundamine; (3) kultuuripärandi konserveerimine linnaplaneerimisel, ning ajaloolistel maastikel ning parkides. (4) pruunalade taaskasutus; (5), ajalooliste hoonete uurimine; ; (6) ehitusmaterjalid, sisekliima, ehitusfüüsikalised ja

energiatõhususe aspektid; (7) betooni taaskasutamise võimalused uue betooni tootmiseks (8) küberfüüsikalised süsteemid hoonete ja linna- ning regionaalplaneerimise teenistuses. Teemad on aktuaalsed linnaplaneerimise valdkonnas ning aitavad lahendada probleeme küberfüüsikaliste süsteemide rakendamise ehituses, tööstuses ja muudes eluvaldkondades.

1.5 Uurimisrühma 2020. aasta rahvusvahelisel tasemel väljapaistvad teadustulemused

Projektid:

LETAE20061 Valga valla miljööväärtuslike alade määramine ning alade väärtustamiseks kaitse- ja kasutustingimuste väljatötamine

LEP19082 "Ruumilise keskkonna planeerimise terminibaasi koostamine ja terminikomisjoni töö korraldamine (30.10.2019–11.01.2021)",

VEU19008 "CA17136 - INDoor AIR POLLution NETwork (2018–2022)", A.Ruus, alagrupi Sampling and instrumentation for monitoring surface transformations of indoor air pollutants -juht

H2020 projekt 945307 eMOTIONAL Cities (Zenia Kotval, juht Lembit Nei)

Artiklid:

Nutt, N.; Kubjas, A.; Kaplinski-Sauk, M. (2020). Eesti ajalooliste mõisaparkide ja metsade puistu liigilise koosseisu võrdluse meetod. *Agraarteadus*, 31 (1). DOI: 10.15159/jas.20.01.

Nutt, N.; Kubjas, A. (2020). Moisture Buffer Value of Composite Material Made of Clay-Sand Plaster and Wastepaper. *Journal of Sustainable Architecture and Civil Engineering*, 27 (2), 108–115. DOI: 10.5755/j01.sace.27.2.25391.

Nutt, N.; Kubjas, A., Nei, L. (2020). Adding waste paper to clay plaster to raise its ability to buffer moisture. *Proceedings of the Estonian Academy of Sciences*, 69 (3), 179–185. DOI: 10.3176/proc.2020.3.01.

Nutt, N.; Kubjas, A.; Nei, L.; Ruus, A. (2020). The Effects of Natural Paints on the Moisture Buffering Ability of Paper Plaster. *Latvian Journal of Physics and Technical Sciences*, 57 (5), 51–60. DOI: 10.2478/lpts-2020-0027.

Nutt, N.; Kubjas, A. (2020). Suitability of the Weber-Gut risk assessment methodology used in Central Europe for determining invasive woody plant species in Estonian historical parks. *Forestry Studies / Metsanduslikud Uurimused*, 72 (1), 21–33. DOI: 10.2478/fsmu-2020-0003.

Nutt, N.; Kubjas, A. (2020). The model of trees for the restoration of historical manor parks in Estonia. *Landscape Architecture and Art*, 16 [ilmumas].

Soolepp, M.; Ruus, A.; Nutt, N.; Raamets, J.; Kubjas, A. (2020). Hygrothermal performance of paper plaster: influence of different types of paper and production methods on moisture buffering. In: *E3S Web of Conferences: 12th Nordic Symposium on Building Physics (NSB 2020 (#14010))*. NSB2020 - 12TH NORDIC SYMPOSIUM ON BUILDING PHYSICS, 6-9 Sept Tallinn. EDP Sciences. DOI: 10.1051/e3sconf/202017214010.

Oras, Sven; Vlassov, Sergei; Vigonski, Simon; Polyakov, Boris; Antsov, Mikk; Zadin, Vahur; Lõhmus, Rünno; Mougin, Karine (2020). The effect of heat treatment on the morphology and mobility of Au nanoparticles. *Beilstein Journal of Nanotechnology*, 11, 61–67. DOI: [10.3762/bjnano.11.6](https://doi.org/10.3762/bjnano.11.6).

Raamets, J.; Ruus, A.; Ivask, M.; Nei, L.; Muoni, K. (2020). Siseõhu kvaliteet põhu- ja pilliroopakkidest seintega elumajades [Indoor air quality in residential buildings with straw- and reed-bale walls]. *Agraarteadus*, XXXI (1), 84–95. DOI: [10.15159/jas.20.05](https://doi.org/10.15159/jas.20.05).

Keskküla, Kadri; Aru, Tambet; Kiviste, Mihkel; Miljan, Martti-Jaan (2020). Hygrothermal Analysis of Masonry Wall with Reed Boards as Interior Insulation System. *Energies*, 13 (20). DOI: [10.3390/en13205252](https://doi.org/10.3390/en13205252).

Salmistu, S.; Kotval-K, Z.; Kotval, Z. (2020). The Use of Contemporary Planning Labels in Professional Practice – A Michigan Example. *Planning Practice and Research*. DOI: 10.1080/02697459.2020.1746038.

Konverentsid

- ICL2020 - Educating Engineers for Future Industrial Revolutions, 23rd International Conference on Interactive Collaborative Learning, 49th IGIP International Conference on Engineering Pedagogy, Tallinn, Estonia, 23-25 September 2020, Virtual Conference. Nele Nutt, **Sirle Salmistu**, Cassi Meitl and Katrin Karu "Case Study in Experiential Learning - From Chaos to Order: Sensemaking With the Interactive Timeline Tool in Architecture and Civil Engineering Studies"
- NSB2020, 12th Nordic Symposium on Building Physics, Tallinn, Estonia, 14 - 17 June, 2020. **Aime Ruus**, Mihkel Soolep, Nele Nutt, Jane Raamets, Ardo Kubjas "Hygrothermal performance of paper plaster: influence of different types of paper and production methods on moisture buffering"

Teadustulemused

Aime Ruusi, Lembit Nei ja Mari Ivaski juhendamisel jõudis doktorikraadini Jane Raamets (samuti Keskkonnatehnoloogia uurimiserühma liige). Töö tulemusena selgus, et põhu- ja roomajad sobivad hästi eesti kliimasse ja on tervisliku sisekliimaga.

Kahanevate linnade uurimisteema (Jiri Tintera, Aime Ruus, Nele Nutt, Zenia Kotval, Minea Kaplinski-Sauk, Sirle Salmistu) 2020. tegevused baseerusid Valga linna problemaatikal ja mitmed väljapakutud lahendused on ka realiseeritud. Alustati Valga miljöövärtuslike alade määramisega ja nende kaitse- ja kasutustingimuste väljatöötamisega. Valga linna Priimetsa kooli endise koolihoone lammutamisel tekkivatest betoonijätmetest saadi esimesed katsekehad, mille alusel hinnata kasutatud betooni karboniseerumist ja tugevusomadusi. Paber-krohvide ning savi-paber-krohvide uuringu tulemused (Nele Nutt, Aime Ruus) on rakendatavad konkreetsete toodete puhul ning kasutatavad mudelarvutustes.

Jiri Tintera kureerib Eesti 2020a. Veneetsia biennaali paviljoni näituse "Plats! väarikas kahanemine" kuraator (17. rahvusvaheline arhitektuurinäitus). Samuti sai ta Eesti Kultuurkapitali arhitektuuri sihtkapitali aastapremia laureaati kategoorias "Arhitektuurialane tegevus või tegu" (näitus on edasi lükatud 2021. aastasse).

1.6 uurimiserühma seotus AAK prioriteetse suunaga (kuni kaks olulisemat suunda)

Targad ja enrgiatõhusad keskkonnad, usaldusväärsed IT lahendused

1.7 uurimiserühma tegevusega seotud teadusvaldkond (Frascati Manuaali teadusvaldkondade ja -erialade klassifikaator)

2.1 Ehitusteadused; 2.11 Teised tehnika- ja tehnoloogiateadused

1.8 uurimiserühma liikmete osalus välisriikide akadeemiate ja/või muude oluliste TA&I-ga seotud välisorganisatsioonide töös lõppenud aastal

Zenia Kotval - Fellow of the American Institute of Certified Planners

Zenia Kotval - Board Member, Planning Accreditation Board 2015-18

Aime Ruus – MC member of COST Action CA17136 - INDoor AIR POLLution NETwork

Sirle Salmistu - 2020 Teadusajakirja "Ageing International" retsensent, 2020 Teadusajakirja "Acta Architecturae Naturalis" (1.2) retsensent, 2020 Teaduskonverentsi publikatsiooni "REV2021

Proceedings, Advances in Intelligent Systems and Computing" retsensent

1 BUILT ENVIRONMENT RESEARCH GROUP

1.1 Head of the research group: Aime Ruus, Associate Professor, aime.ruus@taltech.ee

1.2 Members of research group

Zenia Kotval, PhD, adjunct professor

Mihkel Kiviste, PhD, senior researcher (since 01.09.20) (professor from 01.01.2021)

Merik Meriste, PhD, associated professor

Ernst Tungel, PhD, associated professor

Nele Nutt, PhD, senior lecturer,

Helle Hallik, PhD, senior lecturer,

Ago Roots, MSc, lecturer,

Jiri Tintera, MSc, senior lecturer, PhD

Sven Oras, MSc, senior lecturer, PhD

Jane Raamets MSc, lecturer, PhD since December 2020 (also a member of Research group of Environmental Technologies)

Lehar Leetsaar, MSc, lecturer, doctoral student

Minea Kaplinski-Sauk, MSc, doctoral student

Ardo Kubjas, MSc doctoral student

Taisi Kadarik, MSc, lecturer

Karin Muoni, MSc, lecturer

Sirle Salmistu, PhD, visiting lecturer, Mobilitas Pluss postdoctoral researcher from 01.01.2021

Rinaldo Rütli, MSc, engineer (drones in built environment)

1.3 Keywords

Keywords: brownfields, shrinking cities, urban planning, history of wooden architecture, recycled aggregate concrete, (natural) building materials, indoor climate

1.4 Research areas and competences of the group

(1) built environment, urban and regional planning; (2) community development, economic revitalization, reuse and restoration, urban and rural settlement assessment; (3) heritage conservation in urban planning and historical landscapes and parks; (4) revitalization of brownfield's; (5) examination of historical buildings; (6) construction materials, indoor climate, aspects of building physics and energy efficiency; (7) possibilities to produce recycled aggregate concrete (8) cyber-physical systems for buildings and urban and regional planning.

1.5 Overview of research activities (year 2020)

Projects:

LETAE20061 "Valuable settlement structures in Valga municipality: determining milieu areas and the conditions for their use and protection (1.05.2020–1.05.2021)"

LEP19082 "Termbase of spatial planning (30.10.2019–11.01.2021)",

VEU19008 "CA17136 - INDoor AIR POLLution NETwork (2018–2022)", A.Ruus, leader of subgroup

WG4f Sampling and instrumentation for monitoring surface transformations of indoor air pollutants

Horizon 2020 project 945307 eMOTIONAL Cities (Zenia Kotval, PI Lembit Nei)

Publications:

Nutt, N.; Kubjas, A.; Kaplinski-Sauk, M. (2020). Eesti ajalooliste mõisaparkide ja metsade puistu liigilise koosseisu võrdluse meetod. *Agraarteadus*, 31 (1). DOI: 10.15159/jas.20.01.

Nutt, N.; Kubjas, A. (2020). Moisture Buffer Value of Composite Material Made of Clay-Sand Plaster and Wastepaper. *Journal of Sustainable Architecture and Civil Engineering*, 27 (2), 108–115. DOI: 10.5755/j01.sace.27.2.25391.

Nutt, N.; Kubjas, A., Nei, L. (2020). Adding waste paper to clay plaster to raise its ability to buffer moisture. *Proceedings of the Estonian Academy of Sciences*, 69 (3), 179–185. DOI: 10.3176/proc.2020.3.01.

Nutt, N.; Kubjas, A.; Nei, L.; Ruus, A. (2020). The Effects of Natural Paints on the Moisture Buffering Ability of Paper Plaster. *Latvian Journal of Physics and Technical Sciences*, 57 (5), 51–60. DOI: 10.2478/lpts-2020-0027.

Nutt, N.; Kubjas, A. (2020). Suitability of the Weber-Gut risk assessment methodology used in Central Europe for determining invasive woody plant species in Estonian historical parks. *Forestry Studies / Metsanduslikud Uurimused*, 72 (1), 21–33. DOI: 10.2478/fsmu-2020-0003.

Nutt, N.; Kubjas, A. (2020). The model of trees for the restoration of historical manor parks in Estonia. *Landscape Architecture and Art*, 16 [ilmumas].

Soolepp, M.; Ruus, A.; Nutt, N.; Raamets, J.; Kubjas, A. (2020). Hygrothermal performance of paper plaster: influence of different types of paper and production methods on moisture buffering. In: *E3S Web of Conferences: 12th Nordic Symposium on Building Physics (NSB 2020 (#14010)). NSB2020 - 12TH NORDIC SYMPOSIUM ON BUILDING PHYSICS*, 6-9 Sept Tallinn. EDP Sciences. DOI: 10.1051/e3sconf/202017214010.

Oras, Sven; Vlassov, Sergei; Vigonski, Simon; Polyakov, Boris; Antsov, Mikk; Zadin, Vahur; Lõhmus, Rünno; Mougín, Karine (2020). The effect of heat treatment on the morphology and mobility of Au nanoparticles. *Beilstein Journal of Nanotechnology*, 11, 61–67. DOI: [10.3762/bjnano.11.6](https://doi.org/10.3762/bjnano.11.6).

Raamets, J.; Ruus, A.; Ivask, M.; Nei, L.; Muoni, K. (2020). Siseõhu kvaliteet põhu- ja pilliroopakkidest seintega elumajades [Indoor air quality in residential buildings with straw- and reed-bale walls]. *Agraarteadus*, XXXI (1), 84–95. DOI: [10.15159/jas.20.05](https://doi.org/10.15159/jas.20.05).

Keskküla, Kadri; Aru, Tambet; Kiviste, Mihkel; Miljan, Martti-Jaan (2020). Hygrothermal Analysis of Masonry Wall with Reed Boards as Interior Insulation System. *Energies*, 13 (20). DOI: [10.3390/en13205252](https://doi.org/10.3390/en13205252).

Salmistu, S.; Kotval-K, Z.; Kotval, Z. (2020). The Use of Contemporary Planning Labels in Professional Practice – A Michigan Example. *Planning Practice and Research*. DOI: 10.1080/02697459.2020.1746038.

Conferences

- ICL2020 - Educating Engineers for Future Industrial Revolutions, 23rd International Conference on Interactive Collaborative Learning, 49th IGIP International Conference on Engineering Pedagogy, Tallinn, Estonia, 23-25 September 2020, Virtual Conference. Nele Nutt, **Sirle Salmistu**, Cassi Meitl and Katrin Karu "Case Study in Experiential Learning - From Chaos to Order: Sensemaking With the Interactive Timeline Tool in Architecture and Civil Engineering Studies"
- NSB2020, 12th Nordic Symposium on Building Physics, Tallinn, Estonia, 14 - 17 June, 2020. **Aime Ruus**, Mihkel Soolepp, Nele Nutt, Jane Raamets, Ardo Kubjas "Hygrothermal performance of paper plaster: influence of different types of paper and production methods on moisture buffering"

Results

Under supervision of Aime Ruus, Lembit Nei and Mari Ivask, Jane Raamets defended her doctoral degree in December 2020. She found out that straw-bale and reed houses are suitable in Estonian climate and have healthy indoor climate.

Research of shrinking cities concentrated on problems of Valga town and solutions therein are practised in real situations. Research therein has begun with valuable settlement structures in Valga municipality by determining milieu areas and establishing the conditions for their use and protection. First specimens for evaluating technical conditions (carbonation and strength properties) of used concrete were received from old school building of Priimetsa kool in Valga. **Results in paper**

plaster and clay-paper plaster studies were gathered in numerical values of hygrothermal properties of different products and could be used in hygrothermal modelling as well.

Jiri Tintera is a curator of the exhibition "Square! positively shrinking" in The Estonian Pavilion of The 17th International Architecture Exhibition (Venice Biennale 2020). He is laureate of Cultural Endowment of Estonia in architecture annual award in the category "Architectural activity or act" (postponed due Covid 19 and should take place in 2021).

Additional information

Fields of research: Engineering and technology: Civil engineering

Zenia Kotval - Fellow of the American Institute of Certified Planners

Zenia Kotval - Board Member, Planning Accreditation Board 2015-18

Aime Ruus – MC member of COST Action CA17136 - INDoor AIR POLLution NETwork

Sirle Salmistu - 2020 Reviewer of the scientific journal "Ageing International", 2020 Reviewer of the scientific journal "Acta Architecturae Naturalis", 2020 Reviewer of the scientific conference proceedings "REV2021 Proceedings, Advances in Intelligent Systems and Computing"

1.6 Contribution to R&D priority areas (according to the Academic Strategic Plan of TalTech)

Smart and energy efficient environments; Dependable IT solutions

1.7 Fields of research according to Frascati Manual Classification

2.1 Civil Engineering; 2.11 Teised tehnika- ja tehnoloogiateadused

1.8 Networks & Associations

Zenia Kotval - Fellow of the American Institute of Certified Planners

Zenia Kotval - Board Member, Planning Accreditation Board 2015-18

Aime Ruus – MC member of COST Action CA17136 - INDoor AIR POLLution NETwork

Sirle Salmistu - 2020 reviewer of "Ageing International", "Acta Architecturae Naturalis", reviewer of 2020 "REV2021 Proceedings, Advances in Intelligent Systems and Computing"

2 Keskkonnatehnoloogia uurimisrühm

2.1 Uurimisrühma juht: Annely Kuu, dotsent, annely.kuu@taltech.ee

2.2 Uurimisrühma liikmed:

L.Nei, professor

M.Ivask, emeriitprofessor

E.Haiba, Ph.D, vanemlektor

N. Nutt, Ph.D vanemlektor

K.Kalda, M.Sc, lektor

A.Kosk, M,Sc, lektor

T.Lepasaar, M.Sc, lektor

T.Niine, M.Sc, lektor (kuni 31.07.2020)

J.Raamets, Ph.D, lektor, (osaleb ka Ehitatud keskkonna uurimisrühma teemades)

Järeldoktor Sirle Salmistu- Eakatesõbraliku keskkonna kujundamist mõjutavad faktorid Eestis. Rakendusvõimalused linnaplaneerimises ja avalikus halduses.

Doktorant: Jane Raamets (kuni 17.12.2020). Siseõhu mikrobioloogiline kvaliteet Eesti roo- ja põhupakist elamutes. Juhendajad: Aime Ruus, Mari Ivask, Lembit Nei.

R.Rüütli, M.Sc, insener (droonid ehitatud keskkonnas)

K.Kanger, M.Sc, projektijuht (alates 01.10.2018-01.12.2019, lapsehoolduspuhkusel)

L.Lokko, M.Sc, projektijuht (alates 10.02.2020)

2.3 Võtmesõnad

Keskkonnatehnoloogia, ökosüsteemiteenused, keskkonnamikrobioloogia ja -keemia, ringmajandus, tööstusökoloogia

2.4 Uurimisalused teemad ja uurimisrühma kompetentsid

- Tootmisprotsessiga seotud energia- ja materjalivoogude uurimine, olelusringi hindamine, ressursside efektiivne kasutamine lähtuvalt ringmajanduse konseptsioonist.
- Kompetents jäätmete taaskasutustehnoloogiate arendamisel ja rakendamisel, (ravimijäägid reoveesettes ja nende lagundamise efektiivsus).
- Keskkonnaseisundi hindamise meetodikate väljatöötamine, kasutades mulla mikrobioloogilisi parameetreid ja elustikuparameetreid bioindikaatoritena.

2.5 Uurimisrühma 2020. aasta rahvusvahelisel tasemel väljapaistvad teadustulemused

Uurimisrühma tutvustus

- Tootmisprotsessiga seotud energia- ja materjalivoogude uurimine, olelusringi hindamine, ressursside efektiivne kasutamine lähtuvalt ringmajanduse konseptsioonist.
- Kompetents jäätmete taaskasutustehnoloogiate arendamisel ja rakendamisel, (ravimijäägid reoveesettes ja nende lagundamise efektiivsus).
- Keskkonnaseisundi hindamise meetodikate väljatöötamine, kasutades mulla mikrobioloogilisi parameetreid ja elustikuparameetreid bioindikaatoritena.

Projektid

SEA2LAND „Fishery and aquaculture by-products for healthier soils (01.01.2021-31.12.2024). Tartu kolledž allhankepartner.

KIK20033 "Reoveesettes sisalduvate ravimijääkide lagunemiskiiruse suurendamine kompostimistehnoloogia optimeerimise teel (1.08.2020–30.06.2021)"

VEU19008 "CA17136 - Siseõhu saasteaineid uuriv koostöövõrgustik (7.09.2018–6.09.2022)"

H2020 projekt 945307 eMOTIONAL Cities (Zenia Kotval, juht Lembit Nei)

Tunnustused

- Jane Raamets, "Hea õppejõu arenguprogrammi" tegevustoetuse 2020/2021 õppeaastaks
- Parim õppejõud 2019/2020 oli üliõpilaste tagasiside põhjal Jane Raamets.

PhD kaitsmine

- Piret Vacht (20.03.2020). Sarvlestad ja ränivetikad bioindikaatoritena erineva inimõju tingimuste. Juhendajad: Tiiu Koff, Annely Kuu. Tallinna Ülikool, Loodus- ja terviseteaduste instituut.
- Jane Raamets (17.12.2020). Siseõhu mikrobioloogiline kvaliteet Eesti roo- ja põhupakist elamutes. Juhendajad: Aime Ruus, Mari Ivask, Lembit Nei. Tallinna Tehnikaülikool, Inseneriteaduskond, Tartu kolledž

Koostöö

- Lappeenranta tehnikaülikool (LUT)

Publikatsioonid

Raamets, J.; Ruus, A.; Ivask, M.; Nei, L.; Muoni, K. (2020). Siseõhu kvaliteet põhu- ja pilliroopakkidest seintega elumajades. *Agraarteadus*, XXXI (1), 84–95. (ETIS 1.1)

Raamets, J.; Ruus, A.; Ivask, M.; Nei, L. (2020). Air quality microbiological studies in straw bale and reed houses. *European Biotechnology Congress 2020. Journal of Biotechnology [ilmumas]* (ETIS 5.1)

Nei, L.; Haiba, E.; Lillenberg, M. (2020). Minireview: Pharmaceuticals in sewage sludge and their degradation during composting – recent studies in Estonia. *Agraarteadus*, 31 (1), 47–52 (ETIS 1.1)

Henning, H. E.; Putna-Nimane, I.; Kalinowski, R.; Perkola, N.; Bogusz, A.; Kublina, A.; Haiba, E.; Bärda, I.; Karkovska, I.; Schütz, J.; Mehtonen, J.; Siimes, K.; Nyhlén, K.; Dzintare, L.; Äystö, L.; Siņics, L.; Laht, M.; Lehtonen, M.; Stapf, M.; Stridh, P.; Leisk, Ü. (2020). Pharmaceuticals in the Baltic Sea Region – emissions, consumption and environmental risks. *2020:28*, 1–345. (ETIS 2.5)

Nyhlén, K.; Spjuth, S.; Jakobsson, T.; Äystö, L.; Mehtonen, J.; Lehtinen, T.; Bregendahl, J.; Leisk, U.; Haiba, E.; Schüt, J.; Stapf, M.; Kublina, A.; Szumska, M.; Bogusz, A.; Kalinowski, R. (2020). Recommendations for efficient dissemination of environmental information regarding pharmaceuticals. *2020:27*, 1–29. (ETIS 2.5)

Nei, L.; Haiba, E.; Nei, S. V. (2020). On the degradation of some widely used pharmaceuticals during sewage sludge composting. *Journal of Biotechnology: European Biotechnology Congress 2020. Journal of Biotechnology [ilmumas]*. (ETIS 5.1)

Nei, L.; Haiba, E.; Nei, S. V. (2020). Biodegradability studies of some widely used pharmaceutical during sewage sludge composting. *SETAC Abstract Book: SETAC Europe annual meeting in Dublin, Ireland (3-7 May 2020)*. Dublin: SETAC. (ETIS 5.2)

Nutt, N.; Kubjas, A.; Nei, L. (2020). Adding waste paper to clay plaster to raise its ability to buffer moisture. *Proceedings of the Estonian Academy of Sciences*, 69 (3), 179–185. (ETIS 1.1)

Eklund, J.; Nei, L. (2020). Richard Compton: Thought Leader, Educator and Bon Vivreur. *Journal of Electroanalytical Chemistry*, 872 (Article 114279), 1–3. (ETIS 1.1)

Nutt, N.; Kubjas, A.; Nei, L.; Ruus, A. (2020). The Effects of Natural Paints on the Moisture Buffering Ability of Paper Plaster. *Latvian Journal of Physics and Technical Sciences*, 57 (5), 51–60. (ETIS 1.1)

Ivask M., Kiiker R., Loit K., Põldmets M., Raamets J., Shanskiy M. 2020. Vihmaussikoosluste struktuur ja mulla mikroobikoosluse aktiivsus suvinisu mahe- ja tavatootmispõldudel. *Agronoomia* 2020, lk.18 – 24 (ETIS 3.5)

Ivask M. 2020. Ökoloogilise tasakaalu vähetuntud kindlustajad. *Sinu Mets* 2, 22-23 (ETIS 6.3)

Soolepp, M.; Ruus, A.; Nutt, N.; Raamets, J.; Kubjas, A. (2020). Hygrothermal performance of paper plaster: influence of different types of paper and production methods on moisture buffering. In: E3S Web of Conferences: 12th Nordic Symposium on Building Physics (NSB 2020 (#14010)). NSB2020 - 12TH NORDIC SYMPOSIUM ON BUILDING PHYSICS, 6-9 Sept Tallinn. EDP Sciences. (ETIS 3.1)

Konverentsid

Jane Raamets: E3S Web of Conferences: 12th Nordic Symposium on Building Physics (NSB 2020 (#14010)). NSB2020 - 12TH NORDIC SYMPOSIUM ON BUILDING PHYSICS, 6-9 Sept Tallinn. EDP Sciences.

Egge Haiba: 03-07.05.2020 SETAC Europe 30th Annual Meeting, SETAC SciCon, veebis.

Egge Haiba: 22-25.09.2020 - ICL rahvusvaheline konverents "Educating Engineers for Future Industrial Revolutions"- veebis

Egge Haiba: 24-26.09.2020 - The "European Biotechnology Congress 2020", Praha konverents, poster ettekanne

Egge Haiba: 17.11.2020- TalTechi ja PERHi koostöökonverents: Teadus, tehnoloogia ja meditsiin, suuline ettekanne.

Osalemise võrgustikes

M.Ivask - ESSEM COST Action ES1406 - Soil fauna - Key to Soil Organic Matter Dynamics and Modelling (KEYSOM)

M.Ivask - Maailma looduskaitseorganisatsiooni IUCN juures asuva Euroopa Säästva Kasutamise Grupi (European Sustainable Use Group by IUNC) juhtkomitee liige

E.Haiba - Eesti vee-ettevõtete liidu liige Egge Haiba: Eesti Vee-ettevõtete Liit osaleb projektis

CWPharma- CLEAR WATERS FROM PHARMACEUTICALS

L. Nei – Veeseire töörühm (KKM)

E.Haiba - Rahvusvahelise Inseneripedagoogika Ühingu IGIP liige

L.Nei - Ukraina Teadusfondi ekspert

L.Nei- Serbia Teadusfond – ekspert

2.6 uurimisrühma seotus AAK prioriteetse suunaga (kuni kaks olulisemat suunda)

- Keskkonnaressursside väärastamine

2.7 uurimisrühma tegevusega seotud teadusvaldkond (Frascati Manuaali teadusvaldkondade ja -erialade klassifikaator)

- 1. Bio- ja keskkonnateadused
- 1.9 Keskkonnaohtlike aineid käsitlevad uuringud
- CERCS KLASSIFIKAATOR: T270 Keskkonnatehnoloogia, reostuskontroll

2.8 Tunnustused

- Egge Haiba- TalTechi ja PERHi koostöökonverents: Teadus, tehnoloogia ja meditsiin, suuline ettekanne teemal: "Ravimijäädid keskkonnas". Egge Haiba ettekanne valiti üheks teemaks, mida PERH soovis kuulda, kokku esines 9 inimest TalTech-st, Inseneriteaduskonnast esitati 7, millest valituks sai 3 teemat, neist 1 oli Egge Haiba oma.

2 RESEARCH GROUP OF ENVIRONMENTAL TECHNOLOGIES

2.1 Head of the research group: Annely Kuu, Associate Professor, Annely.kuu@taltech.ee

2.2 Members of the research group:

Lembit.Nei, director, professor

Mari Ivask, professor emeritus

Egge Haiba, PhD, senior lecturer

Jane Raamets, lecturer, PhD since 17.12.2020

Nele Nutt, PhD, senior lecturer,

Tiit Lepasaar, MSc, advisor/lecturer

Kai Kalda, MSc, head of public relations/lecturer

Tiina Niine, MSc, lecturer

Aija Kosk, MSc, lecturer

Sirle Salmistu, PhD, visiting lecturer, Mobilitas Pluss postdoctoral researcher from 01.01.2021

Rinaldo Rütli, MSc, engineer (drones in built environment)

Kärt Kanger, MSc, project manager (on parental leave since 01.12.2019)

Laura Lokko, MSc, project manager

2.3 Keywords:

Environmental technology, ecosystem services, environmental microbiology and -chemistry, circular economy, industrial ecology

2.4 Research areas and competences of the group:

- The studies of energy and material flow, LCA, efficiency in using resources
- Competent in the development and implementation of waste recycling technologies. (drug residues in sewage sludge and their degradation efficiency)
- Development of methodologies for assessing the status of the environment, we use soil microbiological parameters and soil invertebrates' parameters as bioindicators

2.5 Overview of research activities (year 2020)

Introduction of research group

- The studies of energy and material flow, LCA, efficient use of resources based on the concept of the circular economy
- Competent in the development and implementation of waste recycling technologies. (drug residues in sewage sludge and their degradation efficiency)
- Development of methodologies for assessing the status of the environment, we use soil microbiological parameters and soil invertebrates' parameters as bioindicators

Projects

- SEA2LAND „Fishery and aquaculture by-products for healthier soils (01.01.2021-31.12.2024) Tartu College subcontracting partner
- KIK20033. “Optimisation of sewage sludge composting technology with aim of more efficient degradation of pharmaceutical residues (01.08.2020-30.06.2021)”
- VEU19008 “CA17136 - INDoor AIR POLLution NETwork (7.09.2018–6.09.2022)”

Most important acknowledgments

- Jane Raamets, Teaching Development Grant for the 2020/2021 academic year.
- Based on student feedback J.Raamets became the best lecturer in 2019/2020

Defense of PhD thesis

- Piret Vacht (20.03.2020). Diatoms and oribatid mites as bioindicators under different anthropogenic disturbances. Supervisors: Tiiu Koff, Anneli Kuu. Tallinn University, School of Natural Sciences and Health.
- Jane Raamets (17.12.2020). Indoor air microbiological quality in reed-bale and straw-bale houses in Estonia. Supervisors: Aime Ruus, Mari Ivask, Lembit Nei. Tallinn University of Technology School of Engineering, Tartu College

Cooperation

- LUT University, Lappeenranta

Selected publications

Raamets, J.; Ruus, A.; Ivask, M.; Nei, L.; Muoni, K. (2020). Siseõhu kvaliteet põhu- ja pilliroopakidest seintega elumajades. *Agraarteadus*, XXXI (1), 84–95. (ETIS 1.1)

Raamets, J.; Ruus, A.; Ivask, M.; Nei, L. (2020). Air quality microbiological studies in straw bale and reed houses. *European Biotechnology Congress 2020. Journal of Biotechnology* [forthcoming] (ETIS 5.1)

Nei, L.; Haiba, E.; Lillenber, M. (2020). Minireview: Pharmaceuticals in sewage sludge and their degradation during composting – recent studies in Estonia. *Agraarteadus*, 31 (1), 47–52 (ETIS 1.1)

Henning, H. E.; Putna-Nõmme, I.; Kalinowski, R.; Perkola, N.; Bogusz, A.; Kublina, A.; Haiba, E.; Bärda, I.; Karkovska, I.; Schütz, J.; Mehtonen, J.; Siimes, K.; Nyhlén, K.; Dzintare, L.; Äystö, L.; Siņics, L.; Laht, M.; Lehtonen, M.; Stapf, M.; Stridh, P.; Leisk, Ü. (2020). Pharmaceuticals in the Baltic Sea Region – emissions, consumption and environmental risks. *2020:28*, 1–345. (ETIS 2.5)

Nyhlén, K.; Spjuth, S.; Jakobsson, T.; Äystö, L.; Mehtonen, J.; Lehtinen, T.; Bregendahl, J.; Leisk, U.; Haiba, E.; Schüt, J.; Stapf, M.; Kublina, A.; Szumska, M.; Bogusz, A.; Kalinowski, R. (2020). Recommendations for efficient dissemination of environmental information regarding pharmaceuticals. *2020:27*, 1–29. (ETIS 2.5)

Nei, L.; Haiba, E.; Nei, S. V. (2020). On the degradation of some widely used pharmaceuticals during sewage sludge composting. *Journal of Biotechnology: European Biotechnology Congress 2020. Journal of Biotechnology* [forthcoming]. (ETIS 5.1)

Nei, L.; Haiba, E.; Nei, S. V. (2020). Biodegradability studies of some widely used pharmaceutical during sewage sludge composting. *SETAC Abstract Book: SETAC Europe annual meeting in Dublin, Ireland (3-7 May 2020)*. Dublin: SETAC. (ETIS 5.2)

Nutt, N.; Kubjas, A.; Nei, L. (2020). Adding waste paper to clay plaster to raise its ability to buffer moisture. *Proceedings of the Estonian Academy of Sciences*, 69 (3), 179–185. (ETIS 1.1)

Eklund, J.; Nei, L. (2020). Richard Compton: Thought Leader, Educator and Bon Vivant. *Journal of Electroanalytical Chemistry*, 872 (Article 114279), 1–3. (ETIS 1.1)

Nutt, N.; Kubjas, A.; Nei, L.; Ruus, A. (2020). The Effects of Natural Paints on the Moisture Buffering Ability of Paper Plaster. *Latvian Journal of Physics and Technical Sciences*, 57 (5), 51–60. (ETIS 1.1)

Ivask M., Kiiker R., Loit K., Põldmets M., Raamets J., Shanskiy M. 2020. Vihmaussikoosluste struktuur ja mulla mikroobikoosluse aktiivsus suvinisu mahe- ja tavatootmispõldudel. *Agronomia* 2020, lk.18 – 24 (ETIS 3.5)

Ivask M. 2020. Ökoloogilise tasakaalu vähetuntud kindlustajad. *Sinu Mets* 2, 22-23 (ETIS 6.3)

Soolepp, M.; Ruus, A.; Nutt, N.; Raamets, J.; Kubjas, A. (2020). Hygrothermal performance of paper plaster: influence of different types of paper and production methods on moisture buffering. In: *E3S Web of Conferences: 12th Nordic Symposium on Building Physics (NSB 2020 (#14010))*. NSB2020 - 12TH NORDIC SYMPOSIUM ON BUILDING PHYSICS, 6-9 Sept Tallinn. EDP Sciences. (ETIS 3.1)

Conferences

Jane Raamets: *E3S Web of Conferences: 12th Nordic Symposium on Building Physics (NSB 2020 (#14010))*. NSB2020 - 12TH NORDIC SYMPOSIUM ON BUILDING PHYSICS, 6-9 Sept Tallinn. EDP Sciences.

Egge Haiba: 03-07.05.2020 SETAC Europe 30th Annual Meeting, SETAC SciCon, on the web.

Egge Haiba: 22-25.09.2020 - ICL International Conference "Educating Engineers for Future Industrial Revolutions"- on the web.

Egge Haiba: 24-26.09.2020 - The "European Biotechnology Congress 2020", Praga, poster presentation.

Egge Haiba: 17.11.2020- TalTech and The North Estonia Medical Centre (PERH) collaboration conference: „Science, technology and medicine“, oral presentation.

Networks & Associations

M.Ivask - ESSEM COST Action ES1406 - Soil fauna - Key to Soil Organic Matter Dynamics and Modelling (KEYSOM)

M.Ivask- COST. CA18237 European Soil-Biology Data Warehouse for Soil Protection. 2019 sept. - 2023 sept.

M.Ivask - European Sustainable Use Group by IUCN, Committee member

E.Haiba - Estonian Water Works Association (EVEL), member

E.Haiba - International Society for Engineering Pedagogy (IGIP), member.

L. Nei. Expert for the evaluation of ERASMUS+ CBHE applications, Education, Audiovisual and Culture Executive Agency (EU).

L.Nei. Coordinator of EBTNA for Estonia

Outstanding (internationally recognized) research results of the research group for the past year.

- Indoor air quality assessment of straw houses
- Improving composting technologies for sewage sludge, which will significantly increase the speed of the process and reduce the content of hazardous substances in the final product.
- Handbook on soil biota monitoring methodology developed by the COST project.

Jiménez J.J., Filser J., Barot S., Berg M., Briones M.J.I., Bueno G., Curiel Yuste J., Chertov O., Decaens T., Deckmyn G., Domene X., Faber J., Flores O., Franken O., Frey B., Frossard A., Frouz J., Guggenberger G., Hackenberger D., Hattenschwiler S., Hedene P., Iamandei M., Ivask M., et al. (2020). Soil fauna: key to soil organic matter dynamics and modelling. HANDBOOK OF METHODS. COST Action ES1406 "Soil Fauna: Key to Soil Organic Matter dynamics and Modelling", supported by COST (European Cooperation in Science and Technology).62 pp. (ETIS 2.5)

2.6 Contribution to R&D priority areas (according to the Academic Strategic Plan of TalTech)

Valorisation of natural resources

2.7 Fields of research according to Frascati Manual Classification

1. Biosciences and Environment; 1.9. Research into Substances Hazardous to the Environment;

CERCS CLASSIFICATION: T270 Environmental technology, pollution control

2.7 Environmental engineering; 2.11 Other engineering and technologies

2.8 Honours/awards of the research group members at national/international level for the past year.

- Egge Haiba- TalTech and The North Estonia Medical Centre (PERH) collaboration conference: „Science, technology and medicine “, oral presentation. Egge Haiba's presentation was chosen as one of the topics that The North Estonia Medical Centre wanted to hear, a total of 9 people from TalTech were present, 7 from the Faculty of Engineering were presented, from which 3 topics were chosen, 1 of them was Egge Haiba's.