

TTÜ TARTU KOLLEDŽ
TEADUS- JA ARENDUSTEGEVUSE AASTAARUANNE 2012

1. Struktuur

TTÜ Tartu Kolledž, Tartu College of Tallinn University of Technology
Kolledži direktor Lembit Nei

- Keskkonnakaitse õppetool, Department of Environmental Protection, Mari Ivask
- Maastikuarhitektuuri õppetool, Department of Landscape Architecture, Nele Nutt
- Säästva tehnoloogia õppetool, Department of Sustainable Technology, Aime Ruus
- Üldainete õppetool, Department of Basic Studies, Jaak Sikk

2. Teadus- ja arendustegevuse (edaspidi T&A) iseloomustus

(NB! punktid 2.1- 2.6 täidab struktuuriüksus)

2.1 struktuuriüksuse koosseisu kuuluvate uurimisgruppide

2.1.1 teadustöö kirjeldus

Project: Soil biota studies on human affected areas: models, reactions, food webs (B02, project leader A.Kuu, ETF G9258). The data were collected for describing and modeling the structure and function of soil communities on areas damaged by human activities (opencast mining, contaminated industrial areas in the North East of Estonia). In recultivated mining area field inventory of major soil biota groups was carried out. The field studies for investigation of soil, forest litter and floor layer were carried out to find the relationships between litter quantity and quality, and abundance and diversity of soil invertebrates as well as activities of soil microbial community.

Project: Spatial distribution of soil biota and post-flooding recolonization of floodplain and coastal meadows in Matsalu National Park (ETF G 9145, project leader M.Ivask). The detailed altitude model of Kasari Valley was created to analyze the scope of flooding on Kasari floodplain, based on dataset of survey LIDAR (Light Detection And Ranging), Estonian Land Board 2008, and used MapInfo software Vertical Mapper and Surfer 8. In specific points of floodplain the dynamics of flooded water mass was modeled to analyze the scope of flooding. For this the mapping fieldworks were provided in March (measurements of depth of flooding water). Based on the measurements, the Forecast Model of flooding dynamics on Kasari floodplain was created. Study areas were selected using the altitude- and flooding model by principle that some areas are recolonized more quickly and some are covered by flooding water for very long time. We collected material from the non-flooded meadows adjoining flooded areas and from the refugia located on flooded area but never covered by water (methods: hand sorting of soil, using vermifuge, ekstraktion by Tullgren' Funnels, pitfall-traps. Soil samples were collected to analyze microbial community and soil chemical and physical parameters. The taxonomical and ecological structure of soil communities and changes in communities after flooding were analyzed.

Assessment of soil biodiversity by abundance and species composition of Collembolas and earthworm communities (Lep12147). Assessment of soil biodiversity (indicators collembolas and earthworms) on fields, where the non-tillage management was applicated, and on field with

conventional tillage. The relationships between soil and climatic parameters and soil communities parameters were found.

Studies of composting technologies and their impact on pharmaceuticals (KIK11104). Studies of vermicomposting technology. Composting process of waste materials (sewage sludge, textile, paper, carton, etc) was studied. The composting experiments were carried out to study the activities of soil microbial and earthworm community during decomposition process, composting parameters and quality of compost.

2.1.2 aruandeaastal saadud tähtsamad teadustulemused

1. New knowledge of diversity, systematics and ecology of soil biota in Estonia.
2. Diversity and abundance of soil biota communities on recultivated mining areas depends on quantity and quality of plant litter and is the main factor in formation of humus layer.
3. Meadows around flooded areas in Matsalu are characterized by high abundance and diversity of soil invertebrates and can function as refugia in period of flooding.
4. Non-tillage technology when compared with conventional technology is not preferable for soil biota: minimized mechanical disturbance was counterbalanced by higher content of pesticides in plant litter and by lower aeration of soil.
5. Elaboration of composting technologies for several waste materials.

2.2 Uurimisgrupi kuni 5 olulisemat publikatsiooni läinud aastal.

2.3 Loetelu struktuuriüksuse töötajate rahvusvahelistest tunnustustest.

2.4 Loetelu struktuuriüksuse töötajatest, kes on välisakadeemiate või muude oluliste T&A-ga seotud välisorganisatsioonide liikmed.

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

2.5 Aruandeaasta tähtsamad T&A finantseerimise allikad.

2.6 Soovi korral lisada aruandeaastal saadud T&A-ga seotud tunnustusi (va punktis 2.3 toodud tunnustused), ülevaate teaduskorralduslikust tegevusest, teadlasmobiilsusest ning anda hinnang oma teadustulemustele.

- 2012. aastal ilmunud artikli valimine portaali *Earth Emphasis* olulisemate publikatsioonide (key articles) hulka
- Jane Peda – 2. Koht Talveakadeemia üliõpilastööde konkursil
- Annely Kuu – Tartu Kolledži kontaktisik *European Centre of Nature Conservation* (ECNC) juures
- Teadlasmobiilsus: M.Ivask ja A.Kuu Glasgow's (Inglismaa) 27.08.-2.09.2012

2.7 Teadus- ja arendustegevuse teemade ja projektide nimetused (*Eesti Teadusinfosüsteemi, edaspidi ETIS, andmetel*)

- Haridus- ja Teadusministeerium
- sihtfinantseeritavad teemad:

– baasfinantseerimise toetusfondist rahastatud projektid (sh TTÜ tippkeskused):
B02, Mullaelustiku uuringud inimese poolt mõjutatud piirkondades: mudelid, reageeringud, toiduahelad, Annely Kuu (2011 – 2013)

– riiklikud programmid:

- Teiste ministriumide poolt rahastatavad riiklikud programmid:

- Uuriija-professori rahastamine:

- SA Eesti Teadusfond/Eesti Teadusagentuur

– grandid:

– ühisgrandid välisriigiga:

– järel doktorite grandid (SA ETF ja Mobilitas):

ETF9145, Mullaelustiku ruumiline jaotus ja koosluste ülejutusejärgne taastumine Matsalu Rahvusparki lammi- ja rannaniitudel, Ivask Mari (2012 – 2015)

ETF9258, Mesofauna mõju läbi lagunemisprotsesside mulla kvaliteedile, nende olulisus toiduahelas ja suktessioon inimese poolt mõjutatud piirkondades, Kuu Annely (2012 – 2015)

ETF9362, Georges Frédéric Parrot`ja Thomas Jeffersoni poolt rakendatud valgustusajastu haridusideed ning nende tõlgendusvõimalused 21. sajandi hariduses, Tohvri Epi (2012 – 2015)

– tippteadlase grandid (Mobilitas):

- Ettevõtluse Arendamise SA

– eeluuringud:

– arendustoetused:

- SA Archimedesega sõlmitud lepingud

– infrastruktuur (nn „mini-infra“, „asutuse infra“):

– Eesti tippkeskused:

– riiklikud programmid:

– muud T&A lepingud:

- SA Keskkonnainvesteeringute Keskusega sõlmitud lepingud:

KIK11104, Kompostimistehnoloogiate mõju ravimijääkide sisaldusele reoveesettest valmistatud kompostis, Nei Lembit (1.08.2011 - 30.06.2012)

- Siseriiklikud lepingud:

Lep11025, Isotermkarastuse ja silelõike stantsimisega seotud materjali analüüs, Peetsalu Priidu (1.04.2011 - 31.12.2016)

- EL Raamprogrammi projektid:

- Välisriiklikud lepingud:

VIE480, EmPower, Soon Ants (1.07.2010 - 30.06.2013)

VIR516, Energiatõhus ja ökoloogiline majapidamine, Ruus Aime (1.04.2011 - 31.12.2013)

2.8 Struktuuriüksuse töötajate poolt avaldatud eelretsenseeritavad teaduspublikatsioonid (*ETIS klassifikaatori alusel 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.2, 3.3, 4.1 ja 5.1*).

1.1

Hiob, Mart; Nutt, Nele; Nurme, Sulev; De Luca, Francesco. (2012). Risen from the Dead. From Slumming to Gentrification. *Transylvanian Review of Administrative Sciences*, 36 E, 92 - 105.

Järvis, Jüri; Ivask, Mari; Nei, Lembit (2012). Artificial rope - wick roots improve the germination and establishment of tree species. *Seed Science and Technology*, 40(3), 433 - 436.

Rzanny, Michael; Kuu, Annely; Voigt, Winfried (2012). Bottom-up and top-down forces structuring consumer communities in an experimental grassland. *Oikos*, Vol.121 (Issue 12), xxx - xxx. [ilmumas]

Leito, Aivar; Mägi, Eve; Truu, Jaak; Ivask, Mari; Kuu, Annely; Ööpik, Merle; Kuresoo, Andres; Pehlak, Hannes; Sepp, Kalev; Luigujõe, Leho (2012). Breeding waders in West-Estonian coastal grasslands: population trends and relationships with habitat characteristics, land use and prey fauna. *Ibis*, xx - xx. [ilmumas]

Ivask, Mari; Kuu, Annely; Truu, Marika; Kutti, Sander; Meriste, Mart; Peda, Jane (2012). Earthworm communities in Soils of Estonian Wooded Meadows. *Baltic Forestry*, 18(1), 111 - 118.

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Ivask, Mari; Meriste, Mart; Kuu, Annely; Kutti, Sander; Sizov, Eduard (2012). Effect of flooding by fresh and brackish water on earthworm communities along Matsalu Bay and the Kasari River. *European Journal of Soil Biology*, 53, 11 - 15.

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Hiob, Mart; Nutt, Nele; Nurme, Sulev; De Luca, Francesco (2012). Risen from the Dead. From Slumming to Gentrification . *Transylvanian Review of Administrative Sciences*, 92 - 105.

Rauwel, Erwan; Nilsen, Ola; Rauwel, Protima; et al. **Oxide Coating of Alumina Nanoporous Structure Using ALD to Produce Highly Porous Spinel**
Source: *CHEMICAL VAPOR DEPOSITION* Volume: 18 Issue: 10-12 Pages: 315-325 DOI: 10.1002/cvde.201207005 Published: DEC 2012

Rauwel, P.; Rauwel, E.; Persson, C.; et al. **One step synthesis of pure cubic and monoclinic HfO₂ nanoparticles: Correlating the structure to the electronic properties of the two polymorphs**
Source: *JOURNAL OF APPLIED PHYSICS* Volume: 112 Issue: 10 Article Number: 104107 DOI: 10.1063/1.4766272 Published: NOV 15 2012

Rauwel, E.; Rauwel, P.; Ducroquet, F.; et al. **Magnesium metallic interlayer as an oxygen-diffusion-barrier between high-kappa dielectric thin films and silicon substrate**
Source: *THIN SOLID FILMS* Volume: 520 Issue: 17 Pages: 5602-5609 DOI: 10.1016/j.tsf.2012.04.029 Published: JUN 30 2012

Rauwel, Erwan; Galeckas, Augustinas; Rauwel, Protima; et al.
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Source: ADVANCED FUNCTIONAL MATERIALS Volume: 22 Issue: 6 Pages: 1114-1115 DOI:
10.1002/adfm.201200221 Published: MAR 21 2012

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CaHfO₃ and SrHfO₃ Nanoparticles
Source: ADVANCED FUNCTIONAL MATERIALS Volume: 22 Issue: 6 Pages: 1174-1179 DOI:
10.1002/adfm.201101013 Published: MAR 21 2012

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Luminescence Induced by Europium Doping (vol 159, pg P45, 2012)
Source: JOURNAL OF THE ELECTROCHEMICAL SOCIETY Volume: 159 Issue: 5 Pages: S15-
S15 DOI: 10.1149/2.040206jes Published: 2012

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ALD Applied to Conformal Coating of Nanoporous gamma-Alumina: Spinel Formation and
Luminescence Induced by Europium Doping
Source: JOURNAL OF THE ELECTROCHEMICAL SOCIETY Volume: 159 Issue: 4 Pages: P45-
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1.2

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1.3

2.1

2.2

3.1

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3.2

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3.3

Nurme, Sulev; Nutt, Nele. (2012). Pargiterminite seletussõnaraamat. Chaser Print Agency OÜ

4.1

5.1

2.9 Struktuuriüksuses kaitstud doktoriväitekirjade loetelu (*NB! struktuuriüksus lisab struktuuriüksuse töötaja juhendamisel mujal kaitstud doktoriväitekirjade loetelu*)

2.10 Struktuuriüksuses järel doktorina T&A-s osalenud isikute loetelu (*ETIS-e kaudu esitatud taotluste alusel*)

2.11 Struktuuriüksuses loodud tööstusomandi loetelu

6. Struktuuriüksuse infrastruktuuri uuendamise loetelu (*summa eurodes*)

PV007269, Respiromeeter Micro Oxymax, 3.01.2012 (80 442,00)

PV007478, Veetaseme ja soolsuse andurid, 17.10.2012 (14 161,00)