



# WEALTH FROM WASTE

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**Accelerating  
the transition  
to a circular economy  
for metals:  
opportunities  
for innovation**

*World Resources Forum, Geneva  
24-25 October 2017*



Yale SCHOOL OF FORESTRY &  
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# CHALLENGE: TRANSITION TO RECYCLED METALS PLAYING A GREATER ROLE IN FUTURE SUPPLY

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## Mineral supply for sustainable development requires resource governance

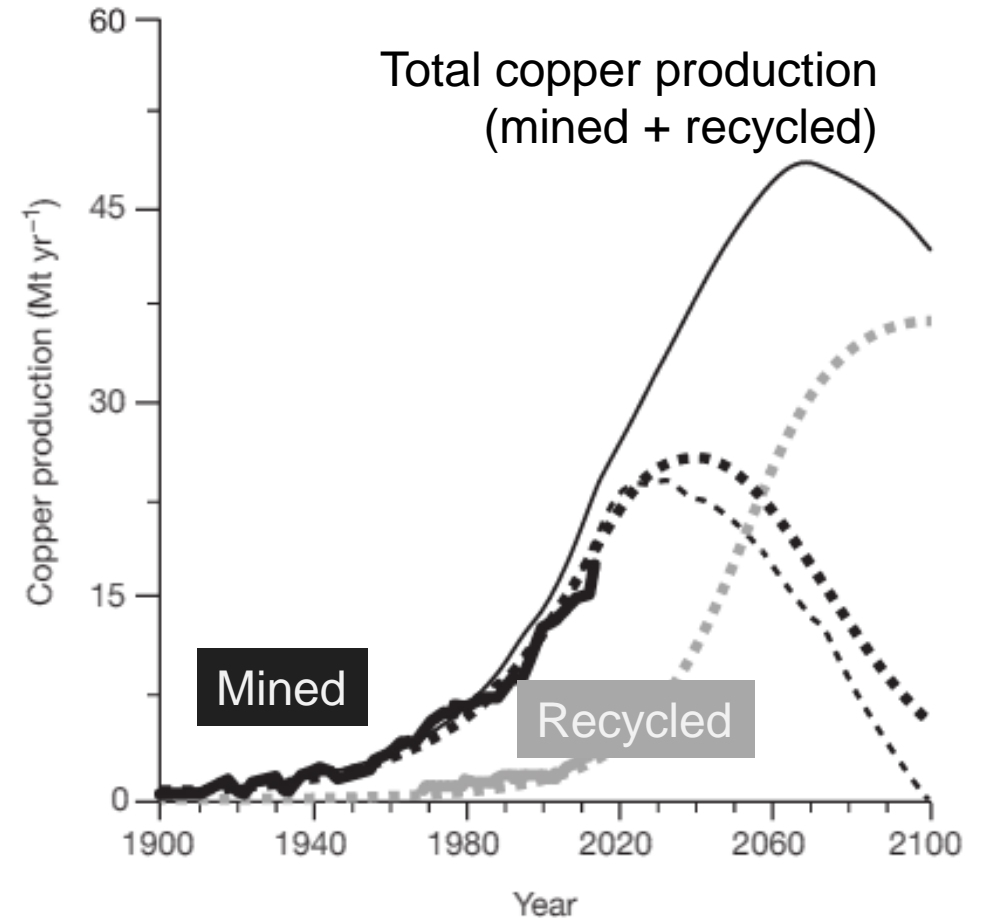
Saleem H. Ali, Damien Giurco, Nicholas Arndt, Edmund Nickless, Graham Brown, Alecos Demetriades, Ray Durrheim, Maria Amélia Enriquez, Judith Kinnaird, Anna Littleboy, Lawrence D. Meinert, Roland Oberhänsli, Janet Salem, Richard Schodde, Gabi Schneider, Olivier Vidal & Natalia Yakovleva

Affiliations | Contributions | Corresponding author

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## Global agreement for metals?



# WEALTH FROM WASTE CLUSTER

Advancing transition pathways towards the circular economy for metals

2013–2017

Ruth Lane



Xuan  
Zhu



Akbar Rhamdhani



Program 1:  
Industrial ecology  
Barriers & enablers

Program 2:  
Mapping urban metal  
stocks & opportunity

Glen Corder



Program 4:  
Transition  
Pathways

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Program 3:  
Future business  
models



Nick Florin



Tom Graedel



J. Lacey



S. King



N. Haque



M. Cooksey



A. Littleboy



Sam Sharpe



Suzanne Benn



# WEALTH FROM WASTE: PHD STUDENTS



*Muhamad Firdaus* –  
**Recovery of rare earths  
from secondary sources**



*Mohammad Al Hossaini Shuva* –  
**Thermodynamics of e-waste**



*Tim Werner* –  
**Indium flows:  
mine waste  
& e-waste**

*Kaye Follett* –  
**Factors affecting use  
and disposal of  
household electronics**



*Eléonore Lebre* –  
**Industrial ecology  
for mining**



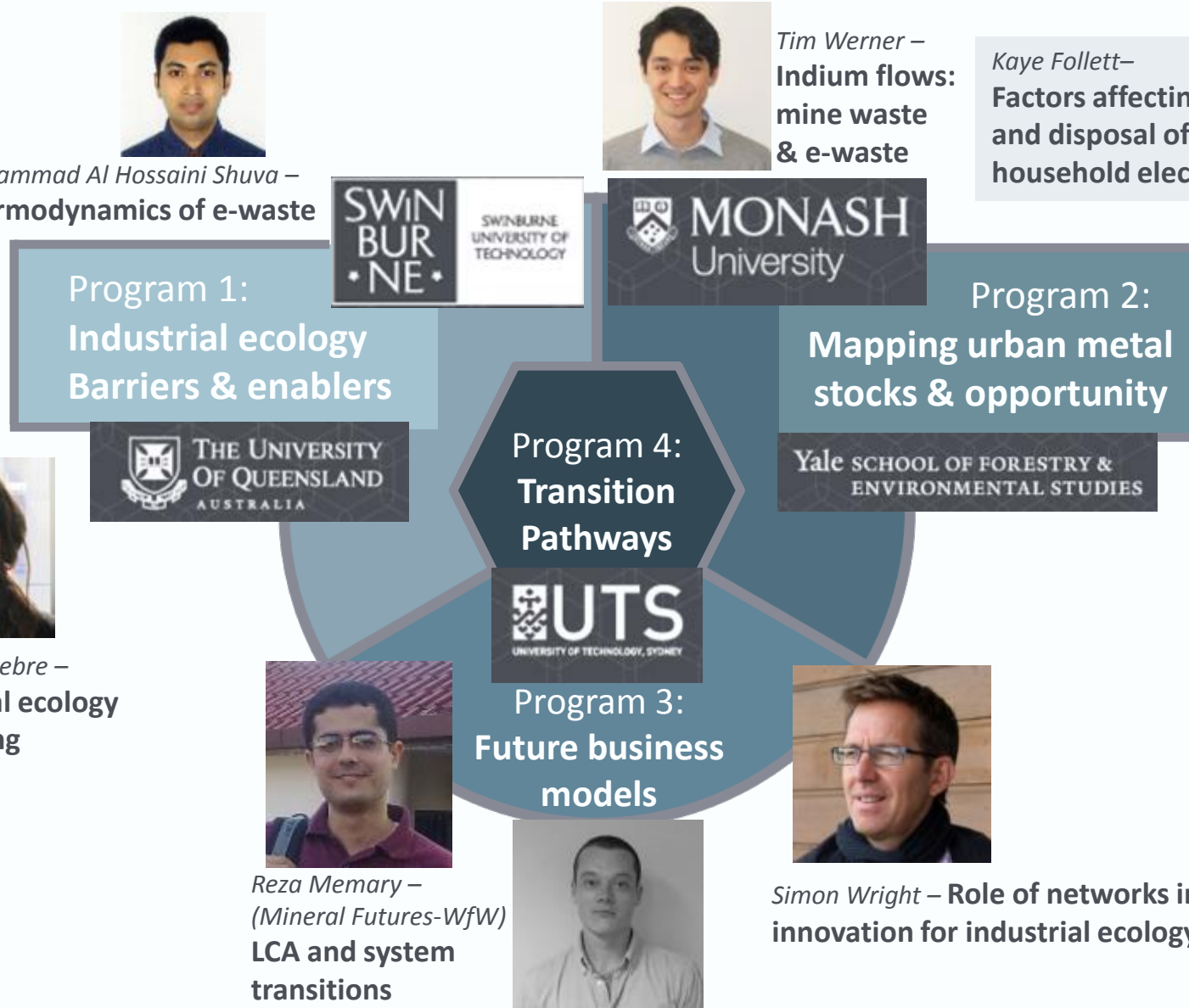
*Reza Memary* –  
*(Mineral Futures-WfW)*  
**LCA and system  
transitions**



*Jacob Fry* – **Waste I-O models** *(at Industrial Ecology Virtual Lab USYD)*



*Simon Wright* – **Role of networks in  
innovation for industrial ecology**



# ROLE OF NEW BUSINESS MODELS

## DOES LEASING SUPPORT RESOURCE EFFICIENCY?



### MOBILE TELEPHONES

- Returned at end of lease and **sold overseas for reuse**
- **Increases collection rates** at end-of-life but chance of rebound effect as leasing may **shorten the first life, drive demand for new phones** and **lose accountability over recycling**



### METALS

- Market is vulnerable to artificial distortions in supply/demand with **risks for manufacturers**
- **Does not guarantee resource efficiency or recycling** as supply can be met with primary sources at end-of-lease

**Highest potential for products that have**

- established second-hand markets & recycling technology
- high value at the end of the lease period

Who is best placed to take action?

- Government
- Research
- Industry

