

# Doing Science in Indonesia: Support and Structure Reform

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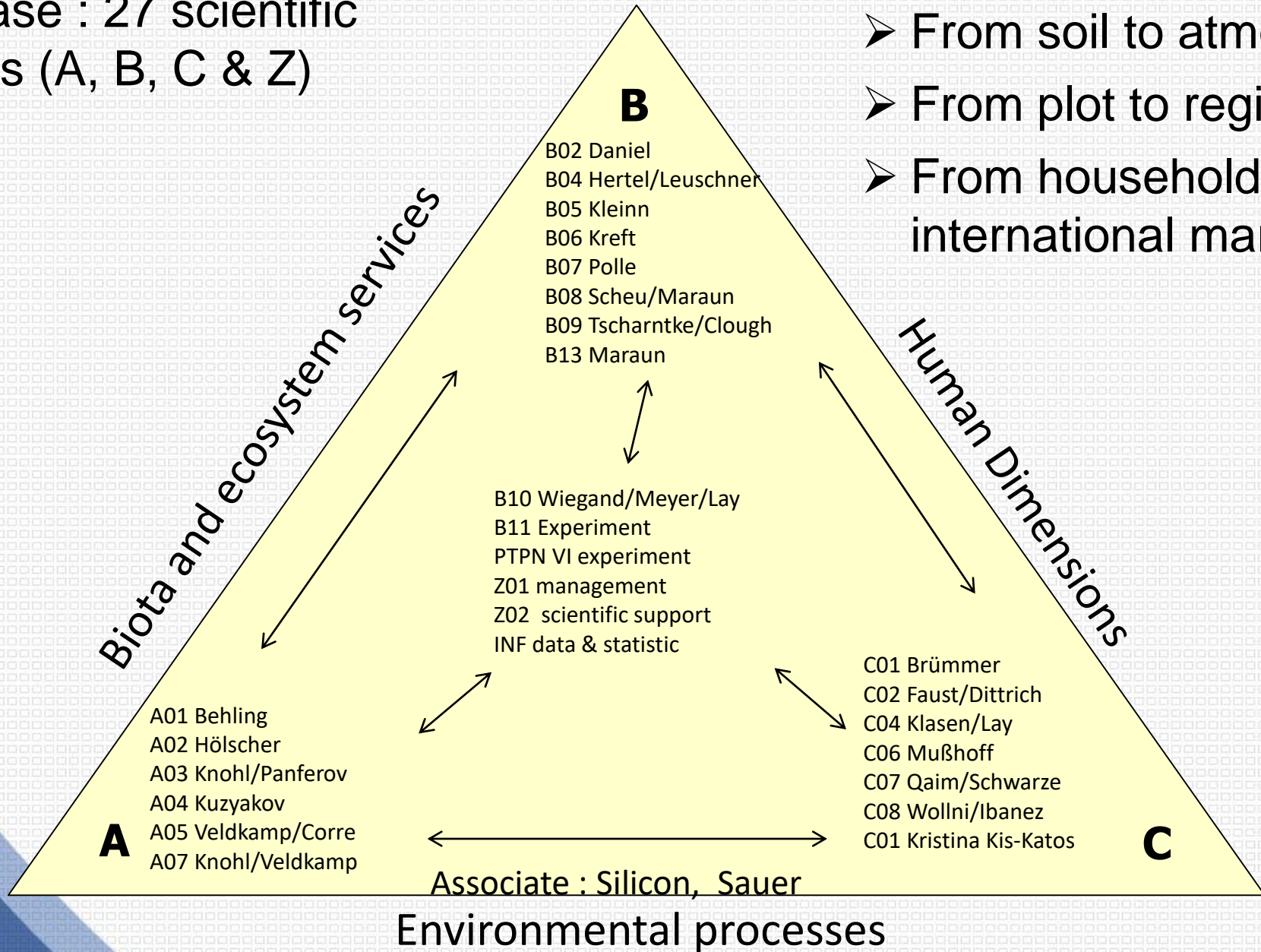
**Speaker of the CRC 990:**



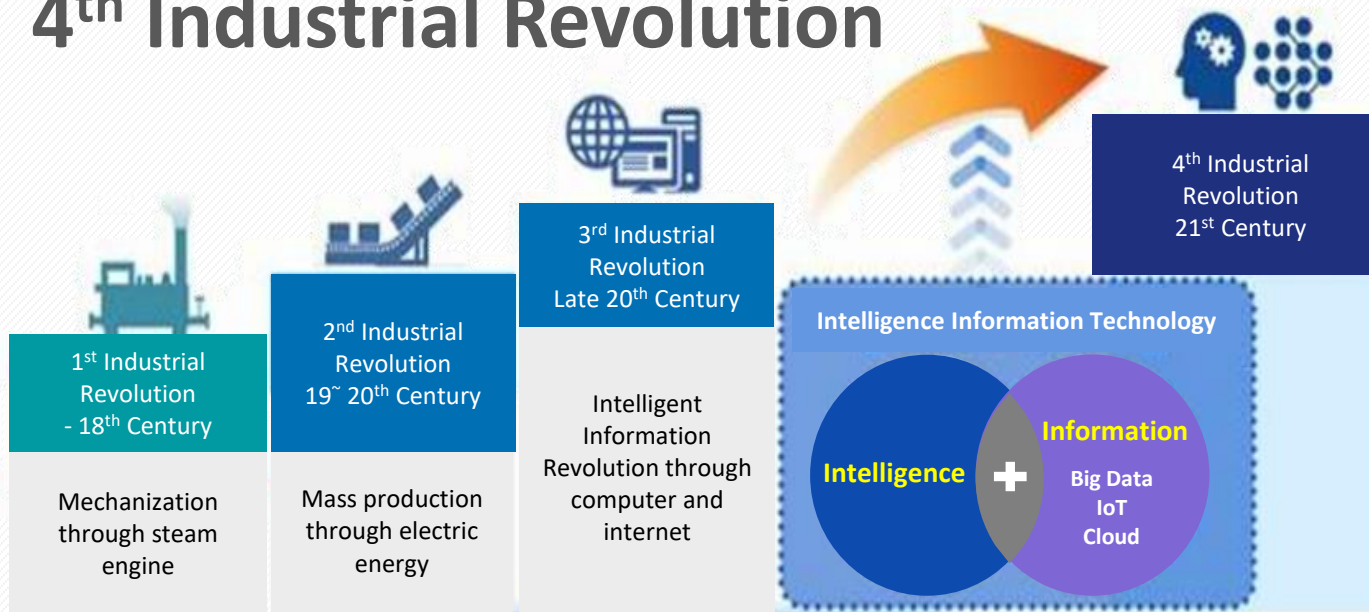
[Prof. Dr. Stefan Schou](#)

2<sup>nd</sup> phase : 27 scientific projects (A, B, C & Z)

- From soil to atmosphere
- From plot to region
- From household to international market



## 4<sup>th</sup> Industrial Revolution



**I**nternet of Things  
**C**loud  
**B**ig data  
**A**rtificial Intelligence  
**M**obile

The 4<sup>th</sup> Industrial Revolution leading the Intelligent Information Society and the Digital Transformation.

5G wireless network: 280 times faster than Long Term Evolution (LTE) and 70 times faster than 4G.

\*Source : <http://www.itu.int/en/mediacentre/Pages/2016-PR35.aspx>



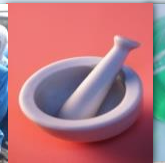
# PERMENPAN dan RB No. 17 tahun 2013 JO no. 46 tahun 2013

- Dosen merupakan **pendidik profesional dan ilmuwan** dengan tugas utama melaksanakan pendidikan, penelitian, dan pengabdian kepada masyarakat
- Kedudukan dosen sebagai tenaga profesional sebagaimana dimaksud dalam Pasal 3 ayat (1) berfungsi untuk meningkatkan martabat dan **peran dosen sebagai agen pembelajaran, pengembang ilmu pengetahuan, teknologi, dan seni, serta pengabdian kepada masyarakat** berfungsi untuk meningkatkan mutu pendidikan nasional

Pejabat yang menilai dan menetapkan PAK/Jabatan Akademik:

- Prinsip otonomi, akuntabilitas dan penjaminan mutu
- Jabatan akademik dosen Asisten Ahli dan Lektor dinilai dan ditetapkan oleh Perguruan Tinggi /KOPERTIS
- Jabatan akademik dosen Lektor Kepala dan Profesor/GB penilaian komponen Penelitian dilakukan oleh Tim Penilai Pusat sedangkan komponen A,C dan D oleh Perguruan Tinggi/KOPERTIS
- PAK Lektor Kepala dan Profesor/GB ditetapkan oleh Dirjen Dikti
- SK Jabatan Akademik Profesor/GB ditetapkan oleh Mendikbud, dan SK Jabatan Akademik LK oleh pejabat yang ditunjuk Mendikbud.

Penilaian angka kredit oleh Tim Penilai Pusat Jabatan Akademik Dosen untuk LK dan GB (Ditjen Dikti)



## Syarat Kenaikan Jabatan Dosen (Permenpan RB 17 jo 46 tahun 2013)

No	Naik Jabatan dari Lektor ke Lektor Kepala
1.	Sekurang-kurangnya telah 2 tahun dalam jabatan Lektor;
2.	Berpendidikan minimal Magister (S2) ;
3.	Memenuhi angka kredit yang dipersyaratkan baik secara kumulatif atau perbidangnya;
4.	<b>Memiliki karya ilmiah yang dipublikasikan dalam jurnal nasional terakreditasi dikti sebagai penulis pertama bagi yang berpendidikan Doktor (S3);</b>
5.	<b>Memiliki karya ilmiah yang dipublikasikan dalam jurnal internasional sebagai penulis pertama bagi yang berpendidikan Magister (S2);</b>
6.	Telah disetujui oleh Senat PT yang dibuktikan dengan Berita Acara Pertimbangan Senat PT/Kriterium.

Melalui jalan kurang jujur : bayar penulis (tdk meneliti?); selfi and welfi



## Peraturan

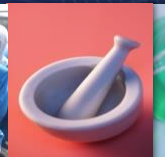
Reformasi tetapi tidak supportive

- Menghindari kecurangan (judgment datang dari science society bukan dari Dirjen Dikti)
- Dosen tidak berkualitas (???)
- Academic leadership yang rendah
- Perubahan cepat tetapi responnya lambat

Memberikan kebebasan dan kemudahan

Desentralisasi vs sentralisasi

(ada indikasi penyalahgunaan -misal inbreeding)



Negara Maju  
VS  
Kurang/tidak maju

Jurang perbedaan tetap lebar

**Kapasitas Sumberdaya manusia**  
**Sistem Pendukung**  
**Infrastruktur untuk Sains dan Teknologi**

These are critical points in the new knowledge based world





In less developed countries, leapfrog the dismally science level by concentrate more on high tech such as

Nuclear, space research, aerospace engineering

Naively think these would somehow convert their countries to industrialized states (?) – but, there were heavy economic and political costs.

We need to adapt and develop technologies appropriate to our local circumstances, help strengthen high quality of education

For Indonesia, it requires modern agriculture-in broad sense, industry systems, and education.

We should not expect to follow the research model that led to the scientific enterprise of e.g. Australia, United States and elsewhere.



# Doing Science in Indonesia

Being a great scientist requires a few key qualities, but to do good science **you need external supports**

Brilliant ideas in science are not coming instantly, but you need :

- ✓ Right scientific atmosphere and
- ✓ Right scientific support

Conceptual progress in science need intense discussions-  
right atmosphere



## Doing Science in Indonesia

Right atmosphere and right support for researcher – centers of excellent

### Example

Ratified all international agreements e.g. highly commit to lowering emission etc

Scientific strategies and achievement?

What is the impact of high CO<sub>2</sub> on photosynthesis, enzymatic process, microbe etc?

**Specific scientific target (sangat umum)**

**Related infrastructure e.g. controlled growth chamber**



PERATURAN MENTERI RISET, TEKNOLOGI, DAN PENDIDIKAN T

REPUBLIK INDONESIA

NOMOR 20 TAHUN 2017

TENTANG

PEMBERIAN TUNJANGAN PROFESI DOSEN DAN  
TUNJANGAN KEHORMATAN PROFESOR

- (1) Apabila lebih dari 1 (satu) orang Dosen bersama-sama membuat suatu karya ilmiah/rancangan dan karya teknologi/rancangan dan karya seni monumental/seni pertunjukan/ menyadur buku ilmiah/mengedit/menyunting/melakukan ulasan/kritik karya ilmiah, pembagian angka kreditnya ditetapkan sebagai berikut :
- 60 % (enam puluh persen) bagi penulis utama; dan
  - 40 % (empat puluh persen) bagi semua penulis pembantu.

PERATURAN MENTERI NEGARA  
PENDAYAGUNAAN APARATUR NEGARA  
DAN REFORMASI BIROKRASI No. 17 tahun 2013  
Jo. No. 46 tahun 2013

Tentang:

**JABATAN FUNGSIONAL DOSEN DAN  
ANGKA KREDITNYA**

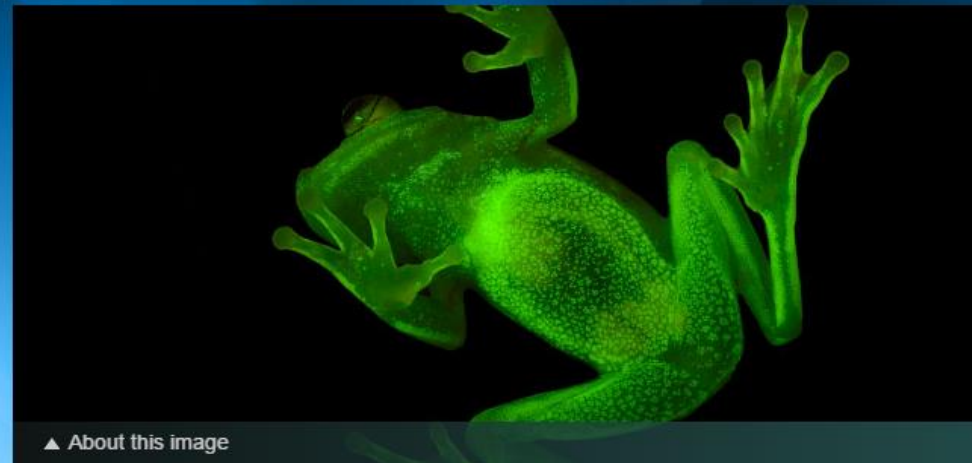
Serta

**Peraturan Bersama Mendikbud dan Kepala BKN  
No. 4/VIII/PB/2014 dan No. 24 Tahun 2014**

Proceedings of the National Academy of Sciences of the United States of America

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▲ About this image

## Current Issue

April 4, 2017 ; 114 (14)

### From the Cover

- Naturally fluorescent frogs
- Eukaryotic DNA mismatch repair
- Genetic risk factor for large artery stroke
- Dead zones and mass coral mortality
- Hybrid incompatibility via epigenetics

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**THE LATEST:** Science Sessions Podcast: Jeff Schneider explains how self-driving cars use machine learning to learn the rules of the road.

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# W. Leung et al. Genes Genome Genet. 5, 719–740 (2015)

## Penelitian dan laporan penelitian (journal/paper) oleh 1014 orang

# Drosophila Muller F Elements Maintain a Distinct Set of Genomic Properties Over 40 Million Years of Evolution

Wilson Leung, Christopher D. Shaffer, Laura K. Reed, Sheryl T. Smith, William Barshop, William Dirkes, Matthew Dothager, Paul Lee, Jeannette Wong, David Xiong, Han Yuan, James E. J. Bedard, Joshua F. Machone, Seantay D. Patterson, Amber L. Price, Bryce A. Turner, Srebrenka Robic, Erin K. Luippold, Shannon R. McCartha, Tezin A. Wajji, Chelsea A. Walker, Kenneth Saville, Marita K. Abrams, Andrew R. Armstrong, William Armstrong, Robert J. Bailey, Chelsea R. Barberi, Lauren R. Beck, Amanda L. Blak, Christopher E. Blunden, Jordan P. Brand, Ethan J. Brock, Dana W. Brooks, Marie Brown, Sarah C. Butzler, Eric M. Clark, Nicole B. Clark, Ashley A. Collins, Rebecca J. Cotteleer, Peterson R. Cullimore, Seth G. Dawson, Carter T. Docking, Sasha L. Dorsett, Grace A. Dougherty, Kaitlyn A. Downey, Andrew P. Drake, Erica K. Earl, Trevor G. Floyd, Joshua D. Forsyth, Jonathan D. Foust, Spencer L. Franchi, James F. Geary, Cynthia K. Hanson, Taylor S. Harding, Cameron B. Harris, Jonathan M. Heckman, Heather L. Holderness, Nicole A. Howey, Dontae A. Jacobs, Elizabeth S. Jewell, Maria Kaisler, Elizabeth A. Karaska, James L. Kehoe, Hannah C. Koaches, Jessica Koehler, Dana Koenig, Alexander J. Kujawski, Jordan E. Kus, Jennifer A. Lammers, Rachel R. Lead, Emily C. Leatherman, Rachel N. Lippert, Gregory S. Messenger, Adam T. Morrow, Victoria Newcomb, Haley J. Plasman, Stephanie J. Potocny, Michelle K. Powers, Rachel M. Reem, Jonathan P. Rennhack, Katherine R. Reynolds, Lyndsey A. Reynolds, Dong K. Rhee, Allyson B. Rivard, Adam J. Ronk, Meghan B. Rooney, Lainey S. Rubin, Luke R. Salbert, Rasleen K. Saluja, Taylor Schauder, Allison R. Schneiter, Robert W. Schulz, Karl E. Smith, Sarah Spencer, Bryant R. Swanson, Melissa A. Tache, Ashley A. Tewilliger

Andrew J. Kim, Kristin A. Knouse, Faith Kung, Danny Mammo, Chun Leung Ng, Vinayak S. Nikam, Diana Norton, Phillip Ham, Jessica W. Polk, Shreya Prasad, Helen Rankin, Camille D. Ratliff, Victoria Scala, Nicholas U. Schwartz, Jessica A. Shuen, Amy Xu, Thomas Q. Xu, Yi Zhang, Anne G. Rosenwald, Martin G. Burg, Stephanie J. Adar Morgan Baker, Bobbi Botsford, Briana Brinkley, Carter Brown, Shadie Emiah, Erica Enoch, Chad Gier, Alyson Greenwell, Lindsay Hoogenboom, Jordan E. Matthews, Mitchell McDonald, Amanda Mercer, Nicholas Monsma, Kristine Ostby, Alen Ramic, Devon Shallman, Matthew Simon, Eric Spencer, Trisha Tomkins, Pete Wendland, Anna Wylie, Michael J. Wolyniak, Gregory M. Robertson, Samuel I. Smith, Justin R. DiAngelo, Eric D. Sasso, Satish C. Bhalla, Karim A. Sharif, Tenzin Choeying, Jason S. Macias, Fareed Sanusi, Karvyn Torchon, April E. Bednarski, Consuelo J. Alvarez, Kristen C. Davis, Carrie A. Dunham, Alaina J. Grantham, Amber N. Hare, Jennifer Schottl, Zackary W. Scott, Gary A. Kuleck, Nicole S. Yu, Marian M. Kaehler, Jacob Jipp, Paul J. Overvoorde, Elizabeth Shoop, Olivia Cyranowski, Betsy Hoover, Matt Kusner, Devry Lin, Tijana Martinov, Jonathan Misch, Garrett Salzman, Holly Schiederemayer, Michael Snaveley, Stephanie Zarrasola, Susan Parrish, Atlee Baker, Alissa Beckett, Carissa Belella, Julie Bryant, Turner Conrad, Adam Fearnow, Carolina Gomez, Robert A. Herbstsomer, Sarah Hirsch, Christen Johnson, Melissa Jones, Rita Kabaso, Eric Lemmon, Carolina Marques dos Santos Vieira, Darryl McFarland, Christopher McLaughlin, Abbie Morgan, Sepo Musokotwane, William Neutzling, Jana Nietmann, Christina Paluskiewicz, Jessica Penn, Emily Peoples, Caitlin Pozmanter, Emily Reed, Nichole Rigby, Lasse Schmidt, Micah Shelton, Rebecca Shuford, Tiara Tirasawasdichai, Blair Undem, Damian Urick, Kayla Vondy, Bryan Yarrington, Todd T. Eckdahl, Jeffrey L. Poet, Alica B. Allen, John E. Anderson, Jason M. Barnett, Jordan S. Baumgardner, Adam D. Brown, Jordan E. Carney, Ramiro A. Chavez, Shelbi L. Christgen, Jordan S. Christie, Andrea N. Clary, Michel A. Conn, Kristen M. Coop, Matt J. Crowley, Samuel T. Crowley, Jennifer S. Doty, Brian A. Dow, Curtis R. Edwards,

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Supports (Right system, infrastructure, academic and research atmosphere, suprastructure)

- ✓ Lingkungan berkarir tidak terjadi perubahan signifikan
- ✓ Sistem pendukung untuk karir sangat lemah (administrasi sangat menonjol)
- ✓ Diskusi ilmiah minim ataupun tidak ada
- ✓ Infrastruktur riset minim dan tertinggal

Hal ini sangat umum; sisi lain kantor-kantor dipenuhi TV dll

Bertahan meneliti melalui kerjasama asing!



# Jaringan kerjasama penelitian berkembang pesat diberbagai belahan bumi



COMPUTED BY O. H. BEAUCHESNE, SCIENCE-METRIX. DATA: SCOPUS.

Bright lines in this map of scientific collaborations between 2005 and 2009 show many joint publications.

Adams, J. 2012 Collaborations: the rise of research networks. Nature 490, 335-336  
<http://www.nature.com/nature/journal/v490/n7420/full/490335a.html>



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# Jaringan kerjasama penelitian berkembang pesat diberbagai belahan bumi

Negara/Dunia	Publikasi bersama partner	Keterangan
Inggris 2011	10.000*	Double dibandingkan 2003
Jerman 2011	10.000*	
Malta 2011	Hanya 50 publikasi yang berpartner dengan Inggris	Tetapi ini sudah 25% dari total publikasi Malta
US 2011	19.141 publikasi bersama Cina 19.090 bersama Inggris 16.753 bersama Jerman	50% paper adalah berpartner
1989	Tidak ada negara yang berpartner lebih dari 1000 paper didunia	
2000	Kerjasama dalam penelitian meningkat drastis Australia lebih dari 10 kali lebih banyak kerjasama dibandingkan sebelumnya	

\*ISI web of science (Thomson Reuters)



Universitas Tadulako  
*Central Sulawesi-Indonesia*



- ✓ Ijin Peneliti asing : 15 dokumen (TKPIPA; 20-23 institusi)
  - ✓ Di daerah : Imigrasi, Kesbangpol, RT, kepala desa
  - ✓ SATSDN
  - ✓ SATSLN (PADIA, Form C, big fund) – 2-3 tahun
- Prosedur yang panjang dan very costly!

The most different :

- Find the scientific atmosphere and culture of science in every corner of the campus
- Not encumbered by bureaucracy  
No need 10 seals on my paper and wait for years only e.g. to get a proper scale  
(Procurement (?))
- No push from high up officials
- Scientific group lead by a reputable Prof – respected by science society
- Simple –well defined and transparent
- Not loaded with many administration tasks

## The most strategic areas to improve

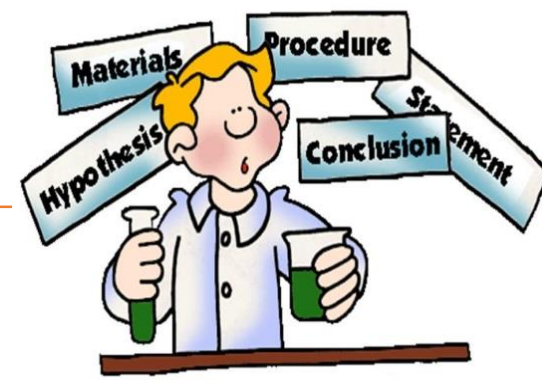
1. Early preparation in science career
2. Mentorship – no science working group  
How and where is the scientific training given to junior researchers really successful? Capacity building is continuum
3. Role models - who?
4. Scientific Atmosphere – science discussion is less
5. Scientific Support System (teaching, supervising, research, be technician, developing proposals for QA- accreditation-public relation; international office Etc.)-play many roles – less specialization.

## The most strategic areas to improve

6. University- Industry (both are weak?) University is lacking capacity to reform
7. Academic leadership

## Individual obstacles

- ⦿ Competing can be uncomfortable; seniority (silent is gold)
- ⦿ Fear of system; higher official rank



# How to survive

- Learn to speak up – science communication
- Take risks
- Build climate of support  
(organization like the AIPI (Indonesian Academy of Sciences, and ALMI (Indonesian Young Academy of Sciences – can build climate of support (?))
- Network – international  
This is often the only solution to stay in science.  
Nowadays – growing permits (protection vs partnership )

More Universities and Scientific Centers in the South that already conduct and produce good research- Indonesia hopefully is going to the right direction!

Scientific excellence depends on the development of scientific leaders

Money is strongly needed to produce good research. But It is not just a question of money. It is also a question of nurturing a scientific culture that encourages researchers to seek new knowledge and, in the process, challenges them to reach their full potential.

Money must be invested in the right way and not spent on frivolous matters that ultimately have scant impact on the quality of science that is done

*A problem can never be solved at the level at which it was created*

# A long way to go...





Terima Kasih  
**Terima kasih**