

# International School of Human Chronobiology and Working Life

**August 8 - 12 2016**  
**1.5 Bologna Credits**



Stockholm Stress Center



Stockholm  
University

# International School of Human Chronobiology and Working Life – August 8-12, 2016

Welcome to this years summer course in August 8-12th in Stockholm! We have put together a program that includes the most inspiring, competent and well-known teachers within the field of chronobiology and working life. The lectures will span from molecular clockworks to study designs. The course is held at the campus of Stockholm University, School of Public Health and Stress Research Institute. The course will be based on seminars with rich opportunities to meet professors and PhD students close to or within the field of chronobiology, but also in an informal way enjoying the summers season. For social events we are dependent on the weather but there are plans for barbecues, swimming in the lake (50 metres from the Stress Research Institute), pubcrawl in Stockholm, Viking Chess (trad Swedish lawn game) or running around the lake

Course leader will be Arne Lowden ([arne.lowden@su.se](mailto:arne.lowden@su.se)) and Claudia Moreno ([crmoreso@usp.br](mailto:crmoreso@usp.br)) and it is supported by the School of Public Health and the Stockholm Stress Center Graduate School.

## Teachers



***John Axelsson*** – Karolinska Institutet, Sweden



***Arne Lowden*** – Stockholm University, Sweden



***Claudia Moreno*** – University of São Paulo, Brazil/Stockholm University, Sweden.



***Malcolm von Schantz*** - University of Surrey, UK



***Debra J. Skene*** – University of Surrey, UK



***Kenneth Wright*** - University of Colorado, US



***Torbjörn Åkerstedt*** – Karolinska Institutet, Sweden

# Course plan

Course aimed for PhD students

International School of Human Chronobiology and Working Life

## Institution

School of Public Health, Stress Research Institute, Stockholm University

## Area

Public Health

## Registration deadline

July 5th, send E-mail to course leader Arne Lowden (arne.lowden@su.se), include full name, and address, motivation and if possible date for acceptance to PhD program.

## Selection criteria

Priority for applying to the course is given students having a (1) Masters exam or acceptance to PhD program, (2) relevance for the dissertation, (3) motivation stated in applicant letter, (3) date for registration to PhD program, (4) inclusion in the Stockholm Stress Center research school.

## Course structure

Code: 331161

Name: International School of Human Chronobiology and Working Life

Course credits: 1.5

## Course fee

The International School of Human Chronobiology and Working Life is free of charge for enrolled PhD students at public universities. In case of non-enrolled students the fee is SEK1500 (app. \$225 / €170).

## Course content

The course presents chronobiological concepts for humans at molecular and at organizational level. In a second step circadian effects and implications for health are presented. Finally countermeasures and treatment for adjusting circadian rhythms within working life will be discussed. The themes for lectures will be:

- What is Chronobiology?
- History of Chronobiology Research
- Basic principles of circadian physiology
- Photic and non-photic time cues
- Interactions Between Sleep and Circadian Physiology
- Molecular clockworks
- Circadian stress and shiftwork
- Methods and designs on chronobiology: General discussion
- Epidemiologic approaches in Chronobiology
- Study designs

## Expected goals:

After the course the student is expected to be able to:

- present main themes within chronobiology having implications on work and health.
- present research methods in chronobiology suited for description of circadian rhythms.
- present major mechanisms in chronobiology involved in the development of disease.
- be able to critically evaluate and form designs in work-related chronobiological research.

## Teaching

Teaching consists of lectures and seminars see program below.

## Examination

Each student performs examination at a seminar including written and oral presentation. The examination has two parts: 1) Power point presentation with a summary of the research area. 2) Written (2-3 pages) and oral presentation of a study that include presentation of a study, choice of methods that seem relevant considering current knowledge in chronobiology and working life. The grade is pass/no pass.

## Limit

Number of students: max 25

## Literature

The course literature is presented in the bibliography below.

## Other

Course coordinator and examiner: Associate Professor Arne Lowden, Stress Research Institute, Stockholm University and Claudia Moreno, School of Public Health, University of São Paulo, São Paulo.

Course date: Week 32, 8-12 August 2016.

Location: Stress Research Institute, Room 207, Frescati hagväg 16 A, 106 91 Stockholm, Sweden

# Schedule

## Monday – August 8th

- 10:00-12:30 • Welcome (all)
  - Introduction of school week
  - Students present their research groups – Data-blitz
- 12:30-13:30 - Lunch
- 13:30-15:00 • History and concepts of Chronobiology (Claudia Moreno)
- 15:00-15:30 - Break for coffee
- 15:30-17:00 • Basics principles of circadian physiology (Debra Skene)

## Tuesday – August 9th

- 09:00-10:30 • Molecular clockworks (Malcolm von Shantz)
- 10:30-11:00 - Break
- 11:00-12:30 • Monitoring circadian rhythms in field and laboratory studies? (Debra Skene/Ken Wright)
- 12:30-13:30 - Lunch
- 13:30-15:00 • Epidemiological approaches in chronobiology (Torbjörn Åkerstedt)
- 15:00-15:30 - Break
- 15:30-16:30 • How to study circadian strain in shiftwork? (Arne Lowden)

## Wednesday – August 10th

- 09:00-10:30 • Sleep and diurnal rhythms (John Axelsson)
- 10:30-11:00 - Break
- 11:00-12:30 • Journal Club (Arne Lowden/Claudia Moreno)
- 12:30-13:30 - Lunch
- 13:30-15:00 • Group work
- 15:00-15:30 - Break
- 15:30-16:30 • Group work

## Thursday – August 11th

- 09:00-10:30 • Chronobiology and metabolism (Ken Wright)
- 10:30-10:45 - Break
- 10:45-12:15 • Group work
- 12:15-14:30 - Lunch
- 15:00-16:30 • Group work

## Friday – August 12th

- 09:00-10:30 • Presentation of study designs (students)
- 10:30-11:00 - Break
- 11:00-12:00 • Presentation of study designs (students)
- 12:00-12:30 • Course evaluation (all)

# Bibliography

1. Archer SN, Laing EE, Möller-Lever CS, van der Veen DR, Bucca G, Lazar AS, Santhi N, Slak A, Kabiljo R, von Schantz M, Smith SP, Dijk DJ: Mistimed sleep disrupts circadian regulation of the human transcriptome. *Proc Natl Acad Sci (USA)* 2014;111:E682-E691.
2. Arendt J, Skene DJ. Melatonin as a chronobiotic. *Sleep Medicine Reviews*. 9 (1):25–39, 2005.
3. Arendt, J., van Someren, E.J.W., Appleton, R., Skene, D.J., Akerstedt, T. Clinical update: melatonin and sleep disorders. *Clinical Med.* (2008) 8, 381-383.
4. Daan S. 2010. A History of Chronobiological Concepts. In: Albrecht U (ed.) *The Circadian Clock* (Protein Reviews). Springer Science, and Business Media, Inc., New York, USA. P. 1-35.
5. Dement WC. History of Sleep Medicine. *Sleep Med Clin* 3 (2008) 147–156, 2008.
6. Fischer FM, Radosevic-Vidacek B, Koscec A, Moreno CRC, Teixeira LR, Lowden A. Internal and External Time Conflicts in Adolescents: Sleep Characteristics and Interventions. *Mind, Brain and Education* (Print), v. 2, p. 17-23, 2008.
7. Kronfeld-Schor N, Bloch G, Schwartz W. Animal clocks: when science meets nature. *Proc. R. Soc. B* 22 vol. 280(1765), 2013.
8. Kuhlman SJ, Mackey SR, Duffy JF. Biological Rhythms Workshop I: Introduction to Chronobiology. *Cold Spring Harb Symp Quant Biol* 72: 1-6, 2007.
9. Lemmer B. Discoveries of rhythms in human biological functions: a historical review. *Chronobiology International*, 26(6):1019-1068, 2009.
10. Lowden A, Moreno CRC, Holmback U, Lennernas M, Tucker P. Eating in shiftwork, effects on habits, metabolism and performance. *Scandinavian Journal of Work, Environment & Health* (Print) , v. 36, p. 150-162, 2010.
11. Lucas, R.J., Peirson, S.N., Berson, D.M., Brown, T.M., Cooper, H.M., Czeisler, C.A., Figueiro, M.G., Gamlin, P.D., Lockley, S.W., O'Hagan, J.B., Price, L.L.A., Provencio, I., Skene, D.J. and Brainard, G.C. Measuring and using light in the melanopsin age. *Trends Neurosci.* (2014) 37, 1-9.
12. Mistlberger, R. and Skene, D.J. Nonphotic entrainment in humans? *J. Biol. Rhythms* (2005) 20, 339-352.
13. Moreno CRC, Louzada, FM. What happens to the body when one works at night? *Cadernos de Saúde Pública* (FIOCRUZ) , Rio de Janeiro, v. 20, n.6, p. 1739-1745, 2004.
14. Möller-Levet CS, Archer SN, Bucca G, Laing EE, Slak A, Kabiljo R, Lo JC, Santhi N, von Schantz M, Smith CP, Dijk DJ.: Effects of insufficient sleep on circadian rhythmicity and expression amplitude of the human blood transcriptome. *Proc Natl Acad Sci (USA)* 2013;110:E1132-1141.
15. Rotenberg L, Moreno CRC, Fischer FM. Intervention measures to deal with the impact of night and shiftwork to workers' health and well-being. In: Ina M. Pearle. (Org.). *Industrial Psychology Trends*. 1 ed. Hauppauge, NY: Nova Science Publishers, 2007, v. 1, p. 105-119.
16. von Schantz M: Phenotypic effects of genetic variability in human clock genes on circadian and sleep parameters. *J Genet* 2008;87:513-519.
17. von Schantz M, Skene DJ: Telling biological time from a blood sample — current capabilities and future potential. *Ann Clin Biochem* 2015;52:699-701
18. Schmoll, C., Lascaratos, G., Dhillon, B., Skene, D. and Riha, R.L. The role of retinal regulation of sleep in health and disease. *Sleep Medicine Reviews* (2011) 15, 107-113.
19. Skene, D.J. and Arendt, J. Circadian rhythm sleep disorders in the blind and their treatment with melatonin. *Sleep Medicine* (2007) 8, 651-655.
20. Skene, D.J. and Arendt, J. Human circadian rhythms: Physiological and therapeutic relevance of light and melatonin. *Ann. Clin. Biochem.* (2006) 43, 344-353.
21. Teixeira L; Lowden A, Luz AA, Turte, SL, Moreno CRC, Valente D, Nagai-Manelli R, Louzada FM, Fischer FM. Exposure to bright light during evening class hours increases alertness among working college students. *Sleep Medicine* 2013; 14: 91-97.
22. Ulhoa M, Marqueze E, Skene D, Kanterman T, Moreno CRC. When does stress end? Evidence of a prolonged stress reaction in shift-working truck drivers. *Chronobiology International* , v. 28, p. 810-818, 2011.

23. Wright Jr K, Burke TM, Lee-Chiong T. Glossary of Circadian Rhythm Terminology for the Researcher and Clinician. *Sleep Med Clin* 4:301–304, 2009.
24. Wright Jr K, Gooley J. Chronobiology Mechanisms and Circadian Sleep Disorders. Amlaner CJ and Fuller PM, Editors. *Basics of Sleep Guide*. 2009; 223-234.
25. Wright Jr K, Lowry CA, Le Bourgeois MK. Circadian and wakefulness-sleep modulation of cognition in humans. *Frontiers in Molecular Neuroscience* Volume5|Article50 | 1, 2012.
26. Wright Jr K, McHill AW, Birks BR, Griffin BR, Chinoy ED. Entrainment of the Human Circadian Clock to the Natural Light-Dark Cycle. *Current Biology* 23, 1554–1558, 2013.

### Postal Address

Stockholm Stress center,  
c/o Stressforskningsinstitutet,  
Stockholm University,  
SE-106 91 Stockholm  
Sweden

### Visiting Address

Frescati hagväg 16 A,  
114 19 Stockholm  
Sweden

### Website

[www.stockholmstresscenter.se](http://www.stockholmstresscenter.se)

### Telephone & Telefax

Switchboard: +468-16 20 00  
Fax: +468-5537 8900

### E-mail

[center@stress.su.se](mailto:center@stress.su.se)



Stockholm  
Stress Center