Wiener Biometrische Sektion
der Internationalen Biometrischen Gesellschaft
Region Österreich – Schweiz
http://www.meduniwien.ac.at/wbs/

Einladung zum

Biometrischen Kolloquium

am **Freitag, 9. November 2012** um **10:30 Uhr** (s.t.)

in der Informatik-Bibliothek (Ebene 3, Raum 88.03.806) des
Zentrums für Medizinische Statistik, Informatik und Intelligente
Systeme (CeMSIIS) der Medizinischen Universität Wien
Spitalgasse 23, 1090 Wien
(Plan siehe http://www.muw.ac.at/cemsiis/allgemeines/anschrift/)

Vortragender:
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Cancer risk assessment: Fractals versus Stochastics

Wir freuen uns auf zahlreichen Besuch.

Gerhard Svolba
Präsident

Franz König
Sekretär

Cancer risk assessment: Fractals versus Stochastics

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When we consider fractal based cancer diagnostic, many times a statistical procedure to assess the fractal dimension is needed. We shall look for some analytical tools for discrimination between cancer and healthy ranges of fractal dimensions of tissues. [1] discussed planar tissue preparations in mice which has a remarkably consistent scaling exponents (fractal dimensions) for tumor vasculature even among tumor lines that have quite different vascular densities and growth characteristics. In [5] we provide extensive study of cancer risk assessment on simulated and real data and fractal based cancer. Both non-random and random carpets are modelling the cancer growth.

On the other hand, in previous investigations, it has been shown that the texture of mammary tissue, as seen at low magnification, may be characterized quantitatively in terms of stereology (see [3] and references therein). In [4], the images of the mammary cases were reexamined (20 cases of mastopathy and 20 cases of mammary cancer, each with 10 images). We will construct a statistical test, which is able to distinguish between the two groups and decide for a possibly new image if it belongs to masthopathic group or not (see [6]).

In the talk we will address some important inverse problems related to extreme process estimation and scaling. Scaling may lead to a range of p-values and powers, which constitutes an inverse problem. Beside this non invasive techniques generally may produce inverse problems, e.g. estimating a Hausdorff fractal dimension from boundary of examined tissue. We will discuss these issues in the context of our recent results (see e.g. [2]). During the talk we will discuss several issues which bring light into both fractal based cancer modelling and more general stochastic geometry models and their comparisons.

REFERENCES

[1] Baish J.W. and Jain R.K. (2000). Fractals and cancer. Cancer Research, 60, 3683-3688.

[2] Filus J., Filus L. and Stehlík M. (2009). Pseudoexponential modelling of cancer diagnostic testing. Biometrie und Medizinische Informatik, Greifswalder Seminarberichte Heft 15, 41-54.

[3] Mattfeldt T. (2003). Classification of binary spatial textures using stochastic geometry, non-linear deterministic analysis and artificial neural networks. Int. J. Pattern Recogn. Artif. Intell. 17, 275–300.

[4] Mrkvička T. and Mattfeldt, T. (2011). Testing histological images of mammary tissues on compatibility with the boolean model of random sets, Image Analysis and Stereology, 30:11-18.

[5] Stehlík M., Giebel S., Prostakova J., Schenk J.P. (2011). Fractal based cancer risk assessment. Technical Report, IFAS.

[6] Stehlík M., Mrkvička T., Filus J. and Filus L. (2012), Recent development on testing in cancer risk: a fractal and stochastic geometry, Journal of Reliability and Statistical Studies Vol. 5, 83-95.