Laplace transform of spherical Bessel functions
A. Ludu and R. F. O'Connell
Phys. Scr., 2002, **65**, 369–372

Laplace transform of the spherical Bessel function is derived in terms of elementary functions containing a polynomial of 'order 1 in the variable p with constant coefficients for the first l–1 powers'. This formula is applied to Langvin equation in the Debye model in one dimension.

Life cycle cost optimization of steel structures
K. C. Sharma and H. Adeli
Int. J. Numer. Meth. Eng., 2002, **55**, 1451– 1462

The life cycle cost of steel structures is modelled containing the main factors influencing the various cost functions. The model is based on fuzzy logic and is implemented in the C-language using IRIX operating system on the SGI origin 2000 supercomputer. It is applied to a large 36-storey irregular moment resisting steel space frame structure, with over 3300 members. The model is optimized based on four different criteria choosing from the commercially available options.

Structural magnetic resonance imaging in patients with first-episode schizophrenia, psychotic and severe non-psychotic depression and healthy controls
R. K. R. Salokangas *et al.*
Br. J. Psychiatry, 2002, **181**, s58–s65

Structural abnormalities are known in the brains of patients suffering from schizophrenia and affective disorders. In this article, scans of magnetic resonance images of brains in various stages of psychotic and non-psychotic patients are compared with those of healthy control. It is concluded that the left-frontal lobe is reduced in first-episode schizophrenia, whereas cerebral ventricles are enlarged in psychotic depression.

Self-recognition promotes the foreign antigen sensitivity of naïve T lymphocytes
I. Stefanova *et al.*
Nature, 2002, **420**, 429–434

It is shown that an interruption of T-cell contact with self-peptide ligands binding to the MHC molecules leads to a decline in response to foreign stimuli. The find-

ings explain the pattern of the adaptive immune response under antigen-limiting conditions.

Cosserat modelling of cellular solids
Patrick R. Onck
CR Mechanique, 2002, **330**, 717–722

Cosserat theory deals with a framework of continuum that circumvents the limitations posed by considerations of the classical continuum theory, namely the characteristic length compared to macroscopic dimensions. A macroscopic cosserat constitutive equation is presented in this paper that relates macroscopic material behaviour with cellular microstructure and morphology.

A new class of regulatory genes underlying the cause of pear-shaped tomato fruit
J. Liu *et al.*
Proc. Natl. Acad. Sci. USA, 2002, **99**, 13302–13306

Fruit shape variation, and subsequent marketability of the product, is a prominent feature of domesticated varieties of fruit-bearing plants. A major quantitative trait locus, ovate, has been cloned from tomato plant that is responsible for the pear-shaped fruit trait. A single point mutation at this locus causes transition from round to pear-shaped fruits. Moreover an ectopic transgenic expression of the protein identifies it to be a member of a class of negative regulators during plant development.

Polyethyleneimine-induced flocculation and flotation of cyanobacterium *Anabaena flos-aquae* for gas vesicle production
M. J. Zeleznik *et al.*
Enzyme Microbial Technol., 2002, **31**, 949–953

Some strains of cyanobacteria contain hollow proteinaceous vesicles that can be used to increase oxygen supply. Gas vesicles in *Anabaena flos-aquae* are cylindrical tubes (500 nm in length and 75 nm in width) closed at both ends, with a 2 nm thick wall permeable to gas but impermeable to liquid water. A continuous culture of cyanobacterium is maintained in a 0.5l glass column bioreactor at 20°C under high illumination with fluorescent lamps. The effect of cationic polymer polyethyleneimine (PEI) and pH

in induction of flocculation and flotation is reported in this paper.

The potato granule bound starch synthase chloroplast transit peptide directs recombinant proteins to plastids
V. Hoppman *et al.*
J. Plant Physiol., 2002, **159**, 1061–1067

The potato granule bound starch synthase (gbss) transit sequence is fused to the green fluorescent protein (GFP) and the strictosidine synthase (str1) enzyme from *Catharanthus roseus*. The gbss-GFP fusion protein is detected exclusively in the plastid stroma confirming the normal localization of transit sequence fusion *in vivo*. The str1 fusion protein also accumulates in plastids, indicating that the potato gbss transit sequence can direct recombinant proteins to chloroplast stroma.

***Agrobacterium*-mediated barley (*Hordium vulgare* L.) transformation using green fluorescent protein as a visual marker and sequence analysis of the T-DNA : : barley genomic DNA junctions**
Y. D. Fang *et al.*
J. Plant Physiol., 2002, **159**, 1131–1138

Optimization of a protocol for *Agrobacterium*-mediated transformation for barley plants is described. Using a fusion of green fluorescent protein (GFP) and selectable marker, immature embryos of barley are transformed in this procedure. Southern blot hybridization and progeny analysis, in addition to fluorescence microscopy, are used to track the incorporation of the marker gene. The authors surmise a similar molecular mechanism of transformation in barley as is known in dicotyledonous plants.

Phytochrome in cotyledons regulates the expression of genes in the hypocotyls through auxin-dependent and – independent pathways
S.-I. Tanaka *et al.*
Plant Cell Physiol., 2002, **43**, 1171–1181

Promoter-enhancer trap lines are constructed to elucidate the mechanism of responses to shading in plants. Auxin-responsive and ABA-responsive genes are found, suggesting the involvement of these chemicals in the responses of plants to shading.