Building long-form content on the web: Columns?

There are layouts that are only possible with columns. Thinking about IEEE and ACM paper formats.

Brownian dynamics simulation of analytical ultracentrifugation experiments

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ABSTRACT

Background: We have devised a protocol for the Brownian dynamics simulation of an analytical ultracentrifugation experiment that allows for an accurate and efficient prediction of the time-dependent concentration profiles, $c(r, t)$ in the ultracentrifuge cell.

Results: Simulations are carried out for four molecules covering a wide range of the ratio of sedimentation and diffusion coefficients. The evaluation is done by extracting the molecular parameters that were initially employed in the simulation by analyzing the profiles with an independent tool, the well-proved SEDFIT software.

Conclusions: Our Brownian dynamics simulation procedure may be considered as an alternative to other predictors based in numerical solutions of the Lamm equation, and its efficiency could make it useful in the most relevant, inverse problem, which is that of extracting the molecular parameters from experimentally determined concentration profiles.

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KEYWORDS

Algorithms, Sequence alignment, Orthologous Genes, Software

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1 BACKGROUND

Since the invention of the analytical ultracentrifuge by Sve
the technique of analytical ultracentrifugation (AUC)
classical - and, thanks to [10, 11] advances in instrume
analysis software, it is still a most modern - technique
terization of macromolecules a and nanoparticles in so
reader may grasp the recent importance of this field in m
and thematic issues of other journals cite.

In the AUC, particles move under influence of a
field, caused by rotation of the sample with angular
which produces a centrifugal force (corrected by buoyanc
$\omega 2\mathrm{rm}(1-\mathrm{v}^{-}\rho)$, where r is the instantaneous distance from
to the rotation axis, m is the mass of the particle ($m = M$
M is the molecular weight and N_A is Avogadro's numbe
partial specific volume of the solute particles and ρ is t
density (nearly equal to the solvent density, if the solutio
The velocity that the solute particles may acquire due to
is proportional to the centrifugal acceleration, $v = s\omega^2 r$,
is the sedimentation coefficient, and modulated also by
coefficient f of the particle in the viscous solvent:

$$s = \frac{v}{\omega^2 r} = \frac{m(1-\bar{v}\rho)}{f} = \frac{M(1-\bar{v}\rho)}{N_A f}$$

If this were the only action on the solute particles, th
would be purely deterministic. If $r(t)$ is the radial posi
particle at time t, one easily finds (considering that $v =$
the position after some time, Δt, would be given by

$$\ln \frac{r(t+\Delta t)}{r(t)} = s\omega^2 \Delta t$$

or

$$r(t+\Delta t) = r(t)\exp(s\omega^2 \Delta t)$$

Even if the initial (loading) concentration in the AUC cell
i.e., constant from the meniscus to the bottom in the
which are placed at distances r_m and r_b , respectively, fro
centrifugation will provoke some transport of the solute pa
therefore a concentration gradient will be produced. Th
will, in turn, generate a counterflow of solute in the d
decreasing concentration, i.e., contrary to the centrifug
Macroscopically, at a point r the counterflow would be
by the first law of Fick, $J = -D\nabla c(r, t)$, where D is th

Figure 1: Example of a two column paper for ACM publications

IEEE Format

A DEFENSE AGAINST WORM ATTACKS BASED ON CROSS HONEYFARM WITH HONEY POTS

Title (use style: *paper title*)

Subtitle as needed (*paper subtitle*)

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***Index Terms*—Component, formatting, style, styling, insert.** *(key words)*

I. Introduction *(Heading 1)*

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IV. Prepare Your Paper Before Styling

Before you begin to format your paper, first write and sa the content as a separate text file. Keep your text and grap

Figure 2: Example of a paper formatted for IEEE publication

The biggest difference is that the paper formats are paginated so it's relatively easier to shift from one column to another and from page to page. Because the web is one continuous format, reading columns becomes much harder since we have to scroll to get to the bottom of one column and then scroll to the top to start the next one.

If we have small blocks of text then it would be easy to use common column markup like this:

```
.columns-block {
  columns: 2;
  gap: 4em;
}
```

the `columns` selector tells the browser how many columns to create. We can also specify a width like `300px` and the browser will try to fit as many columns of that width in the available space.

Controlling the height of the columns is more complex since we don't know how high the text will be and controlling overflow can also be troublesome since there's no way to make overflowing content flow into a different portion of the page.

Fragmentation would help solve the issue by providing ways for the text to flow from one block to another, just as if the layout was paginated but, as far as I know, there are no fragmentation layouts that work to handle flowing text into multiple areas of the same page in any modern browser. Right now the only fragmentation layout deals with breaks in pages and columns. While there are provisions for breaks in regions, there is no implementation of CSS regions in any modern browser.

Both CSS Regions and CSS Exclusions haven't been updated in over five years so there's good reason to think that the specifications are no longer in active development.