$$y_i \sim Poisson(\lambda_i)$$
$$ln(\lambda_i) = a_{p[i]} + \tilde{f}_{g[i],p[i]} + f_{g[i]}$$

$$a_{p[i]} = \mu + \sigma * z_{p[i]}$$
$$\mu \sim Unif(-\infty, \infty)$$
$$\sigma \sim \mathcal{N}(0, 1)$$
$$z_{p[i]} \sim \mathcal{N}(0, 1)$$

$$\boldsymbol{f} \sim GP(0, K_{\rho,\alpha})$$
$$\rho \sim InvGamma(10, 500)$$
$$\alpha \sim \mathcal{N}(0, 1)$$

$$\tilde{\boldsymbol{f}}_{\boldsymbol{p[i]}} \sim GP(0, K_{\tilde{\rho},\tilde{\alpha}})$$
$$\tilde{\rho} \sim InvGamma(20, 600)$$
$$\tilde{\alpha} \sim \mathcal{N}(0, 1)$$